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The Joint Air Land Battle System: An Alternative To The Air Ground Operations System

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A Master of Military Art and Science thesis presented to the faculty of the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas 66027

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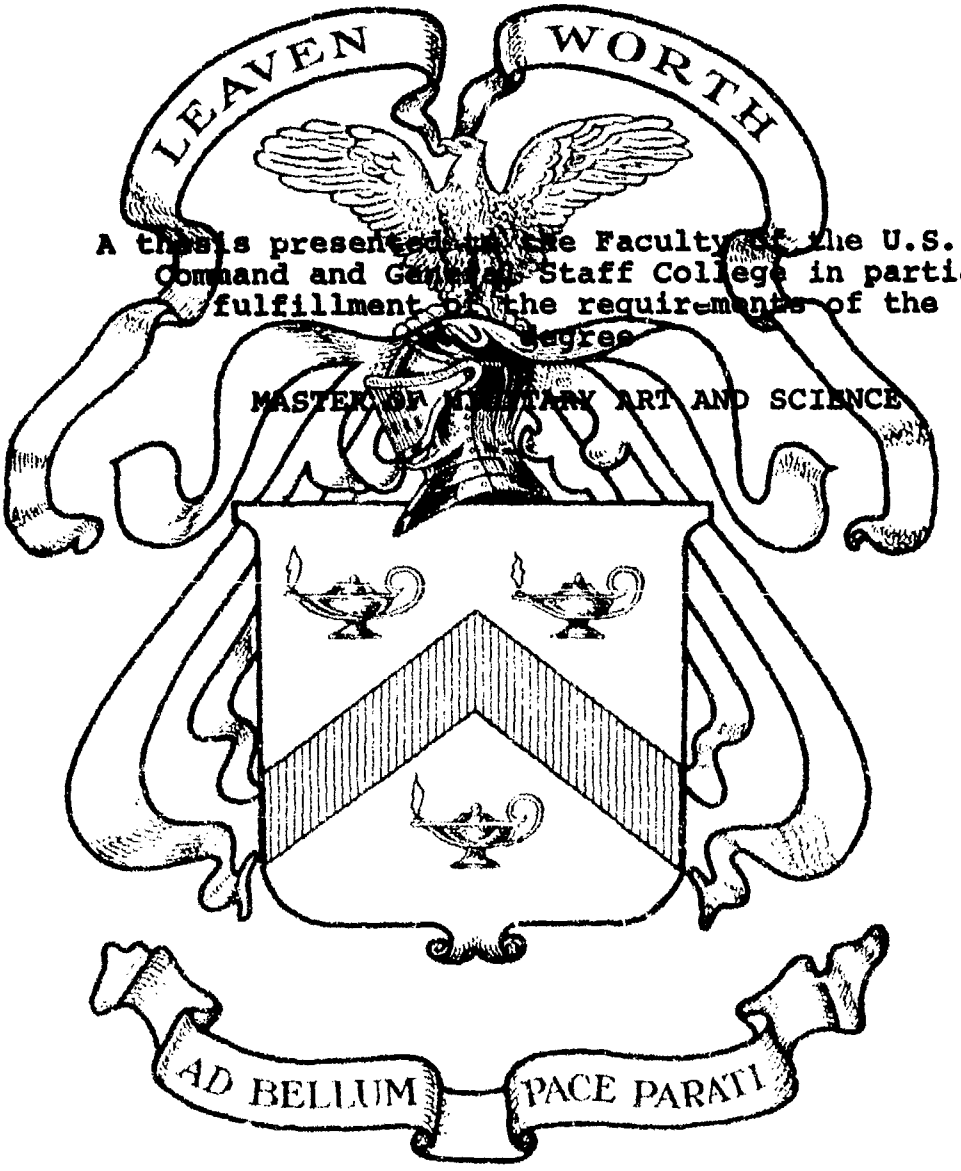
The 1973 Middle East War demonstrated the lethality of modern warfare and the need to integrate combined arms doctrine into the United States Army and Air Force. The AirGround Operations System (AGOS) of the US Army and Air Force integrates tactical airpower into the ground battle. The AGOS system must be capable of supporting the principles of war in a modern air land battle. This study attempts to determine if the AGOS system or a new system, the Joint Air Land Battle System (JALBS) is the best concept against Soviet equipped and doctrine oriented forces.

The two systems are investigated using the tactical air functions of close air support, interdiction, and counterair to determine which system provides the best tactical air support to ground forces. The study concludes that the JALBS concept provides better tactical air support than the AGOS system. The conclusion is based on a comparison of each system's ability to apply the principles of war in a modern air land battle, a war game using the two systems, and an evalution of each system's capability to support time and space momentum.

THE JOINT AIR LAND BATTLE SYSTEM:

AN ALTERNATIVE TO THE

AIR GROUND OPERATIONS SYSTEM



A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements of the degree

MASTER OF MILITARY ART AND SCIENCE

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MASTER OF MILITARY ART AND SCIENCE

by

J. R. NICHOLS, MAJ, USAF
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The opinions and conclusions expressed herein are those of the individual student author and do not necessarily represent the views of either the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

The 1973 Middle East War demonstrated the lethality of modern warfare and the need to integrate combined arms doctrine into the United States Army and Air Force. The Air Ground Operations System of the US Army and Air Force integrates tactical airpower into the ground battle. The AGOS system must be capable of supporting the principles of war in a modern air/land battle. This study attempts to determine if the AGOS system or a new system, the Joint Air Land Battle System (JALBS), is the best concept against Soviet-equipped and doctrine-oriented forces.

The two systems are investigated using the tactical air functions of close air support, interdiction, and counter-air to determine which system provides the best tactical air support to ground forces. The study concludes that the JALBS concept provides better tactical air support than the AGOS system. The conclusion is based on a comparison of each system's ability to apply the principles of war in a modern air/land battle, a war game using the two systems, and an evolution of each system's capability to support time and space momentum.

PREFACE

This study investigates the Air Ground Operations System, which provides the doctrine for using tactical airpower to support US Army ground forces. An alternative concept is offered to replace and update the doctrine in the AGOS system. This new concept is labeled the Joint Air Land Battle System (JALBS). The perceptions concerning the advantages, disadvantages, and relative merits of each system are evaluated and presented. It is hoped that this thesis will provide a foundation to build a better system for tactical air support of US ground forces in the modern air/land battles of the present and future.

I would like to thank Major William J. Foster, USAF, my faculty advisor, Major David Skaggs, USAR, my consulting advisor, Lieutenant Colonel R. H. DuPont, USA, and Major Gary Nophsker, USAF, for the constructive criticism and valuable suggestions made throughout the research and during the preparation of this study. A special word of appreciation must be extended to the officers of the Air Land Battle Facility, United States Army Command and General Staff College, for their valuable time spent war gaming the AGOS and JALBS systems.

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GLOSSARY OF TERMS

Army Air Ground System

AAGS. The Army system which provides for interface between Army and tactical air support agencies of other Services in the planning, evaluating, processing, and coordinating of air support requirements and operations. It is composed of appropriate staff members, including G-2 air and G-3 air personnel, and necessary communications equipment.

Air Defense Artillery

ADA. Weapons and equipment for actively combating air targets from the ground. Weapons are classed as: LIGHT 20-57 mm; MEDIUM 58-99 mm; HEAVY 100mm or greater.

Air Force Component Headquarters

AFCH. The field headquarters facility of the Air Force commander charged with the overall conduct of Air Force operations. It is composed of the command section and appropriate staff elements.

Air Ground Operations System

AGOS. An Army/Air Force system providing the ground commander with the means for receiving, processing, and forwarding the requests of subordinate ground commanders for air support missions and for the rapid dissemination of information and intelligence.

Air Lift Control Center

ALCC. That agency of the Air Force component commander tasked to support by air landing or airdrop including air supply, movement of personnel, evacuation of casualties and prisoners of war, and recovery of equipment and vehicles.

Allocation

The apportionment of specific numbers and types of aircraft sorties for use during a specified time period or for carrying out an assigned task.

Combined Arms Center Development Agency

CACDA. Army command under the Training and Doctrine Command tasked with the development of doctrine for combined arms.

Close Air Support

CAS. Air attacks against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces. Air missions flown between the forward edge of the battle and the Fire Support Coordination Line.

Cluster Bomb Unit

CBU. Groups of bomblets released together. A cluster usually consists of fragmentation or incendiary bomblets.

Command and General Staff College

CGSC. United States Army intermediate professional military school located at Fort Leavenworth, Kansas.

Critical Incident

CI. War gaming term relating to a major action over a set time period in which selected parameter can be measured.

Combat Information Center

CIC. USAF agency equipped and manned to provide the intelligence support for the Air Force component commander.

Corps Tactical Operations Center.

CTOC. Subunit of corps headquarters where the commander and the staff perform their activities. In combat, the subunit from which the corps commander operates.

Direct Air Support Center

DASC. A subordinate operational component of a tactical air control system designed for control and direction of close air support and other tactical air support operations and is normally collocated with fire support coordination elements.

Direct Observation and Fire Line

DOFL. A control line for close air support missions drawn one and one half times the range of the organic direct fire weapons in front of the line of contact. DOFL model; a prescriptive change to the present AGOS.

Doctrine

Fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgment in application.

Fire Support Coordination Center

FSCC. A single location in which are centralized communications facilities and personnel incident to the coordination of all forms of fire support.

Fire Support Coordination Line

FSCL. An imaginary line arranged, if possible, to follow well defined geographical features, prescribed by the troop commander and coordinated with appropriate supporting commanders, forward of which supporting forces may attack targets, without danger or reference to the ground forces. Behind this line the attack of targets by forces not under the control of the troop commander must be coordinated with the appropriate troop commander.

Forward Air Controller

FAC. An officer (aviator/pilot) member of the tactical air control party who, from a forward ground or airborne position, controls aircraft engaged in close air support of ground troops.

Forward Edge of the Battle Area

FEBA. The foremost limits of a series of areas in which ground combat units are deployed, excluding the areas in which the covering or screening forces are operating, designated to coordinate fire support, the positioning of forces, or the maneuver of units.

Joint Task Force

JTF. A force composed of assigned or attached elements of the Army, the Navy or the Marine Corps, and the Air Force, or two or more of these Services, which is constituted and so designated by the Secretary of Defense or by the commander of a unified command, a specified command or an existing joint task force.

Near Real Time

Delay caused by automated processing and display between the occurrence of an event and reception of the data at some other location.

Real Time

The absence of delay, except for the transmission by electromagnetic energy, between the occurrence of an event or the transmission of data, and the knowledge of the event, or reception of the data at some other location.

Surface-to-Air Missile

SAM. A surface launched missile designed to operate against a target above the surface.

Tactical Air Control Center

TACC. The principal air operations installation (land or ship-based) from which all aircraft and air warning functions of tactical air operations are controlled.

Tactical Air Control Party

TACP. A subordinate operational component of a tactical air control system designed to provide air liaison to land forces and for the control of aircraft.

Tactical Air Control System

TACS. The organization and equipment necessary to plan, direct, and control tactical air operations and to coordinate air operations with other Services. It is composed of control agencies and communications-electronics facilities which provide the means for centralized control and decentralized execution of missions.

Tactical Air Support Element

TASE. An element of a United States Army division or corps tactical operations center consisting of G-2 and G-3 air personnel who coordinate and integrate tactical air support with current tactical ground operations.

Tactical Operations Center

TOC. A physical groupment of those elements of an Army general and special staff concerned with the current tactical operations and the tactical support thereof.

Tactical Unit Operations Center

TUOC. A physical groupment of those elements of an Air Force Wing necessary to control the current tactical operations and the tactical support thereof.

Chapter 1

INTRODUCTION

Tactical airpower support for US Army ground forces could be improved by replacing the present Air Ground Operations System (AGOS) with a new system, the Joint Air Land Battle System (JALBS). The purpose of this study is to examine both systems, AGOS and JALBS, to determine if the JALBS system can provide a greater impact on the modern air/land battle than the AGOS system. The two systems will be evaluated as to their ability to maximize tactical air assets, maximize the number of valid targets struck, maximize all available firepower, reduce complexity of control and provide for a clear picture of current operations. In order to provide a constant setting for evaluation, a common scenario will be used. The scenario deals with a deployed Joint Task Force (JTF) consisting of a tactical Air Force and an Army Light Corps. The JTF mission is to aid a friendly nation in restoring its international border, by defeating a Soviet equipped and doctrine-oriented foe. Chapter 4 expands the scenario, when the two systems are compared through use of a map war game. To narrow the scope of the study,only the tactical airpower missions of close air support (CAS), counterair (CA), and interdiction are considered.

Chapter 1 explores the rationale for conducting evaluations on existing doctrine by studying the Soviet philosophy for doctrine review. The Middle East War of 1973 is used as an example of the need to update doctrine. A common view of tactical airpower is established in Chapter 1 and a historical review of the development of the AGOS system is presented. The AGOS system is addressed in Chapter 2 by explaining the functions of tactical airpower, the Tactical Air Control System (TACS), and the Army Air Ground System (AAGS). Chapter 3 introduces the JALBS system as envisioned by this writer. The need for a fast Forward Air Controller (FAC) is justified and two new concepts are introduced. The first is a new control measure called the Direct Observation and Fire Line (DOFL). The second is the Joint Combat Coordination Center (JCCC). Chapter 4 is an evaluation of each system's ability to support the principles of war and the momentum of time and space. The results of a war game conducted using the common scenario are presented at the end of Chapter 4. Chapter 5 outlines the conclusions of the study.

The Soviets view doctrine as an ever changing process. Although a war between the United States and the Soviet Union may be considered remote, the Armed Forces of the United States can expect to be confronted in a future contingency by Soviet equipped and doctrine-oriented forces. The rationale for conducting a study on the doctrine contained in the Air Ground Operations System lies in the Soviet philosophy on reviewing doctrine.

SOVIET PHILOSOPHY

> We cannot mechanically transfer the experience of past wars to a new situation; this can bring only harm. However, even under these conditions a profound study of the military experience of the past permits understanding the present better and foreseeing the future (42:5).

The above thoughts of the Soviet Minister of Defense, Marshal Malinovsky, were first published outside the Soviet Union in 1965, following the ouster of Nikita S. Khrushchev. When Marshal Malinovsky's Problems of the Revolution in Military Affairs was published by the Military Publishing House in Moscow, it constituted a Soviet indepth study into the nature of modern war.

The number of military publications issued since 1965 for study in the Soviet Union is unknown in the United States. However, the Soviet armed forces are continually reviewing doctrine for modern war. "The Soviet Armed Forces maintain over one hundred higher military schools with courses ranging from four to five years" (42:IV). During these years of study, a considerable amount of time is given to review of doctrine, strategy, and tactics. Several hundred Soviet officers hold a degree in military science equivalent to the PhD in the United States. Exported Soviet doctrine, used by Egypt in the 1973 Middle East War, highlights the results of the Soviet's efforts.

MIDDLE EAST DOCTRINE

The armed forces of the United States are spending a great deal of time examining current doctrine as a result of the 1973 Middle East War. The 1973 Middle East War may well be subjected to more analysis than the sum of all other wars. The reason is the "technological surprises of the war" (43:37). Perhaps a more accurate explanation of the war's importance lies in the lack of an update in the Israeli doctrine to counter known Soviet weapons and doctrine. The Israeli forces were guilty of a "mechanical transfer" of the experiences of the War of Attrition during 1969-70. The Egyptian forces, on the other hand, updated doctrine to counter Israeli doctrine, as evident in the change in Egyptian air defense doctrine. In 1969-70, the Israeli Air Force could attack anyplace in Egypt, at will. In 1973, the Israeli Air Force suffered such heavy losses in the first two days of the war that Lt. Gen. Benjamin Peled, commander of the Israeli Air Force, ordered his pilots "not to approach closer than 15 mi. to the Canal" (40:12).

The key to effective use of force lies in the manner with which the force is applied and not in total to the hardware available to the force. The AGOS contains the doctrine for using tactical airpower in the modern air/land battle. The United States system is a direct result of the experience of the Army and Air Force in the Vietnam Conflict. The mechanical transfer of the AGOS to the next battle without evaluation and updating could result in a tactical surprise for US

forces. A common view of tactical airpower should be established in a study of tactical airpower doctrine.

VIEWS OF AIRPOWER

Robin Higham in Airpower: A Concise History states:

> The question of how airpower can best be developed in peace and used in war is one to which very varied answers have been given, both in theory and in practice since the outbreak of the First World War. Some Air Forces have been created and used almost exclusively as 'long-range artillery' for land or sea forces. Others have been looked on as self-sufficient strategic weapons capable of deciding the issue of even major wars on their own. In addition many enthusiasts for airpower have tended to treat war in the air as something totally different from war on land or sea and therefore not subject to the same overriding principles (25:8).

In this study, tactical airpower will be viewed as long-range artillery and as a power that is subject to the principles of war that govern the land battle. The concept of using tactical airpower as long-range artillery is consistent with and encompasses all the elements of the current doctrine for counterair, interdiction, and close air support. Airpower is an integral part of the air/land battle, and any study of airpower use must take into account the general principles of war. These general principles are given as Concentration of Effort, Control, Simplicity, Cooperation of All Arms, Surprise, Speed of Action, and Seizing the Initiative. Airpower, although controlled by the principles of war, is essentially a technical weapon and, when used by trained professionals, can provide a coup de main - "a knockout blow at the beginning of a conflict" (25:14).

Success or failure in war is related to weapons available and their manner of employment. As noted earlier, the Soviet forces are in a continuous process of updating doctrine. The consequence of not updating doctrine was illustrated briefly in the Israeli Air Force experience of the 1973 Middle East War. The use of the Soviet and Israeli examples to provide emphasis for the need to review the AGOS is not to be taken at face value. Soviet forces now outnumber US forces and are equipped with comparable equipment. US doctrine cannot be lacking against such a formidable future foe. The 1973 Middle East War illustrates the impact doctrine can make when not updated. Robin Higham's views on airpower provide for a common departure point for this essay--that airpower is subject to the principles of war. The present AGOS system is a product of experience and congressional emphasis.

HISTORICAL REVIEW

In the fall of 1965, the Committee on Armed Services of the House of Representatives conducted hearings through a special subcommittee to investigate, in depth, certain aspects of tactical airpower, with special attention to the war in Vietnam. The committee addressed the following major subject areas:

> 1. The adequacy or inadequacy of our close air support; 2. Recent progress in developing and producing new type aircraft for tactical warfare; 3. The development of new tactics and techniques for air support; 4. Present and future capacities for maintaining air superiority in tactical situations; 5. The adequacy of existing logistic and support

> facilities for tactical aircraft; 6. Costs, quantities, and effectiveness of the various tactical aircraft (17:4859).

This effort, on the part of Congress, gave both services an impetus to refine the then existing AGOS by improving the two services systems. The subcommittee reported the following results:

> In the earlier days of the war in Vietnam our close air support was frequently ineffective and primitive. This was due to many factors. As one witness put it, sometimes when he needed and called for close air support the message never got through because of radio transmission failures. Sometimes the message got through and the air support never came. Sometimes the air support came and missed the target; sometimes the air support came and was very effective. It can certainly be said that there has been a substantial improvement; it cannot be said that it is as effective as it should be. Perhaps the most appalling fact which came to the attention of the subcommittee was the fact that until very recently the Air Force, which has the responsibility for providing close air support to the Army on the ground, could not talk to the Army on the ground because the Air Force radios were not compatible with Army radios (17:4861).

Work had been done on AGOS prior to 1965, but little attention had been given to the results of various review boards and symposiums. Foremost among these studies was the Tactical Air Support Evaluation Board which published A Report on the United States Air Force's Tactical Air Support Requirements (U), chaired by Lt. Gen. G. P. Disosway, USAF, and the Close Air Support Board which published United States Army--United States Air Force Close Air Support Boards Final Report (U), with Lt. Gen. J. S. Upham, Jr., President of the US Army Board and Maj. Gen. F. M. Dean, President of the US Air Force Board.

Both boards helped formulate the structure of the AGOS system prior to the Armed Services Subcommittee Report.

The Subcommittee made two major conclusions: first, the Air Force had never developed an aircraft for close air support; and second,

> because of the desire on the part of both services to avoid irritating service rivalries and the roles and missions issue, essential questions have gone unanswered, and essential problems have been swept under the rug (17:4872).

The first area was corrected with the development of two close air support aircraft, the A-7 and the A-10. The second problem area was resolved with AGOS command and control improvements.

The AGOS system was developed through service evaluation boards and congressional emphasis and performed well in the Vietnam Conflict. Why is there a need to review a workable, operational system? The answer is two-fold. The first part was answered in the early paragraphs of this chapter with the review of Soviet doctrine revisions and the Egypt-Israeli doctrinal gap. The second part of the answer lies in the level of the threat the system faced in Vietnam versus the threat the system must face against a Soviet-equipped and doctrine-oriented force. The problem with the system is at the top and the bottom of the present AGOS doctrine. At the top is the need to generate the proper split of tactical airpower to provide for close air support, interdiction, and counterair missions. This thesis will not address reconnaissance or airlift missions. In the Vietnam Conflict, there existed a relative excess of tactical airpower when compared to the number of targets tactical

air would face in a modern Soviet-type ground force. Can AGOS handle the increase in targets? This question is key to the thesis development and will be addressed in detail in following chapters. At the bottom end of the air ground system, the target and tactical air are brought together. The Forward Air Controller (FAC) is now the critical control element that ensures aircraft control and target destruction.

In order to be most effective, the FAC must be airborne. Once airborne, the FAC can view the total situation unhampered by the visual obstructions from a ground vantage point. Although there is a place for the ground FAC in the air ground system, the ability to find targets and control air strikes is limited by inherent immobility and limited observation.

Figure 1 illustrates a situation that was true of the present AGOS in the Vietnam Conflict. The number of close air support sorties flown and controlled by the airborne FAC was relatively high in the low to medium threat environment when compared to interdiction or counterair sorties. The FAC flying slow moving aircraft, such as the O-2 or OV-10, could survive in the low threat environment. Low threat is defined as small arms fire and limited automatic weapons fire. Medium threat adds such weapons as the SA-7, man launched heat seeking missile, and higher caliber automatic weapons that force the FAC to fly higher than desired altitudes in order to survive. High threat includes the Soviet family of surface to air missiles (SAM) and fighter aircraft. The slow moving FAC

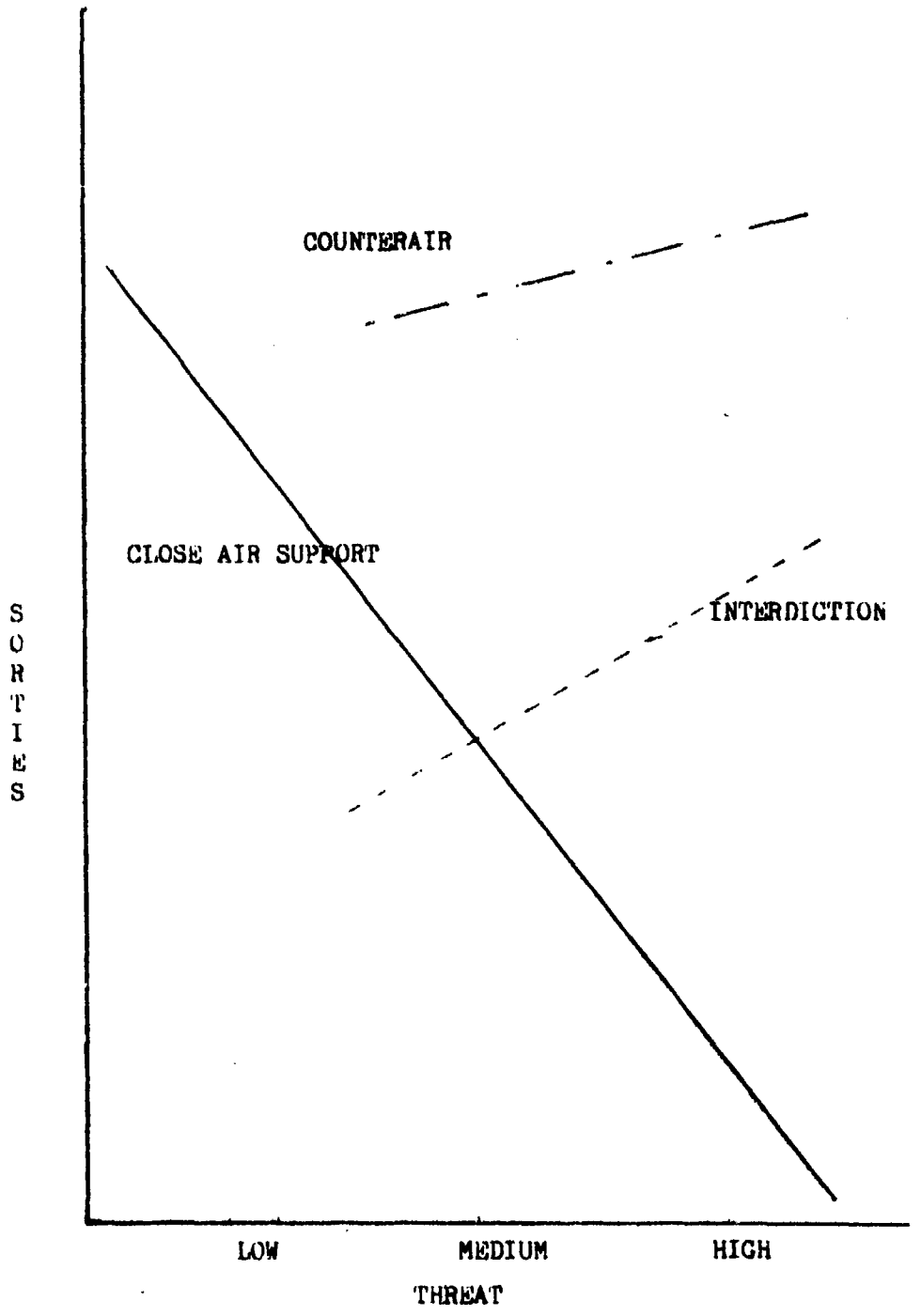

Figure 1. Tactical Air Sorties Versus Threat

aircraft of today may not survive a high threat environment. Soviet forces and those forces equipped by the Soviet Union could present a high threat environment to the FAC in a future air/land battle. The present AGOS operates well in the low to medium threat but could be limited to only a ground FAC in a high threat environment without a fast FAC aircraft. The US Air Force in the high threat environment of North Vietnam operated away from the line of contact of ground forces in South Vietnam and performed the missions of interdiction and counterair. Those interdiction missions requiring a FAC were controlled by a fast FAC in either an F-100F or F-4D/E aircraft.

The term fast FAC is best understood in terms of mission and equipment: "A fast FAC performs low level visual reconnaissance and forward air controlling tasks in an aircraft capable of sustaining speeds over 400 knots" (26:1). The role and mission of both the fast and slow FAC are the same, separated only by the ability of the fast FAC to survive in the high threat areas. It is of special note that 20 percent of the fast FAC sorties flown by Air Force and Marine aircrews interviewed in A Study of Fast Forward Air Controller and Tactical Air Coordinator (Airborne) Operations, 1969 to 1973, a Department of Defense study, were close air support sorties.

However, the fast FAC program that was used during Vietnam has been terminated by the US Air Force. Based on the experience in Southeast Asia, the fast FAC could be effectively employed in providing close air support in a future air/land battle in a high threat environment (24:134).

Following the review of the Air Ground Operations System in Chapter 2, the use of the fast FAC in close air support will be fully explored as a key element to the JALBS concept.

Chapter 2

THE AIR GROUND OPERATIONS SYSTEM

This chapter explores the present air ground operations system (AGOS) by defining how the system functions. The air ground operations system is composed of both Air Force and Army elements. The Tactical Air Control System (TACS) is the Air Force element and the Army Air Ground System (AAGS) is the Army element. Both service elements combine to provide the means to initiate, receive, process, and execute requests for tactical air support and to disseminate information obtained by tactical air resources.

FUNCTIONS OF TACTICAL AIRPOWER

The tactical air functions are close air support, interdiction, counterair, tactical air reconnaissance, and tactical airlift. As mentioned in Chapter 1, reconnaissance as such and airlift will not be addressed in this study. An understanding of the terms close air support, interdiction, and counterair is necessary.

Close air support (CAS) is "air action against hostile targets that are in close proximity to friendly forces and that require detailed integration of each air mission with the fire and movement of those forces" (64:15). Air Force close air support is normally performed by tactical fighter aircraft

under the command and control of the Air Force Component Commander of a Joint Task Force (JTF). Sorties for close air support are apportioned for Army use by percentage of available sorties. These sorties are further divided as to preplanned or immediate.

A preplanned request for a close air support sortie is submitted for targets that can be anticipated in time to allow for the detailed coordination between Army and Air Force staff elements. Preplanned sorties tend to be the best use of close air support since they are the most economical use of the available sorties. Immediate close air support sorties are those sorties that do not allow for detailed planning, due to the time element or the urgency of the ground situation. Preplanned close air support sorties are processed through Army chain of command channels and are normally approved at corps level. Once approved, the request for preplanned sorties is passed to the Tactical Air Control Center (TACC) for Air Force execution. Figure 2 shows the flow for both preplanned and immediate requests for close air support. Immediate close air support sortie requests, which may originate at any level, are passed by the Air Force Tactical Air Control Party (TACP) located at battalion and above, to the Direct Air Support Center (DASC) located with each corps or independent division. Each intermediate unit headquarters monitors and acknowledges the request. If the request is not disapproved or other fires substituted, the DASC coordinates with the Tactical Air Support Element (TASE) at corps, obtains the TASE approval, and directs

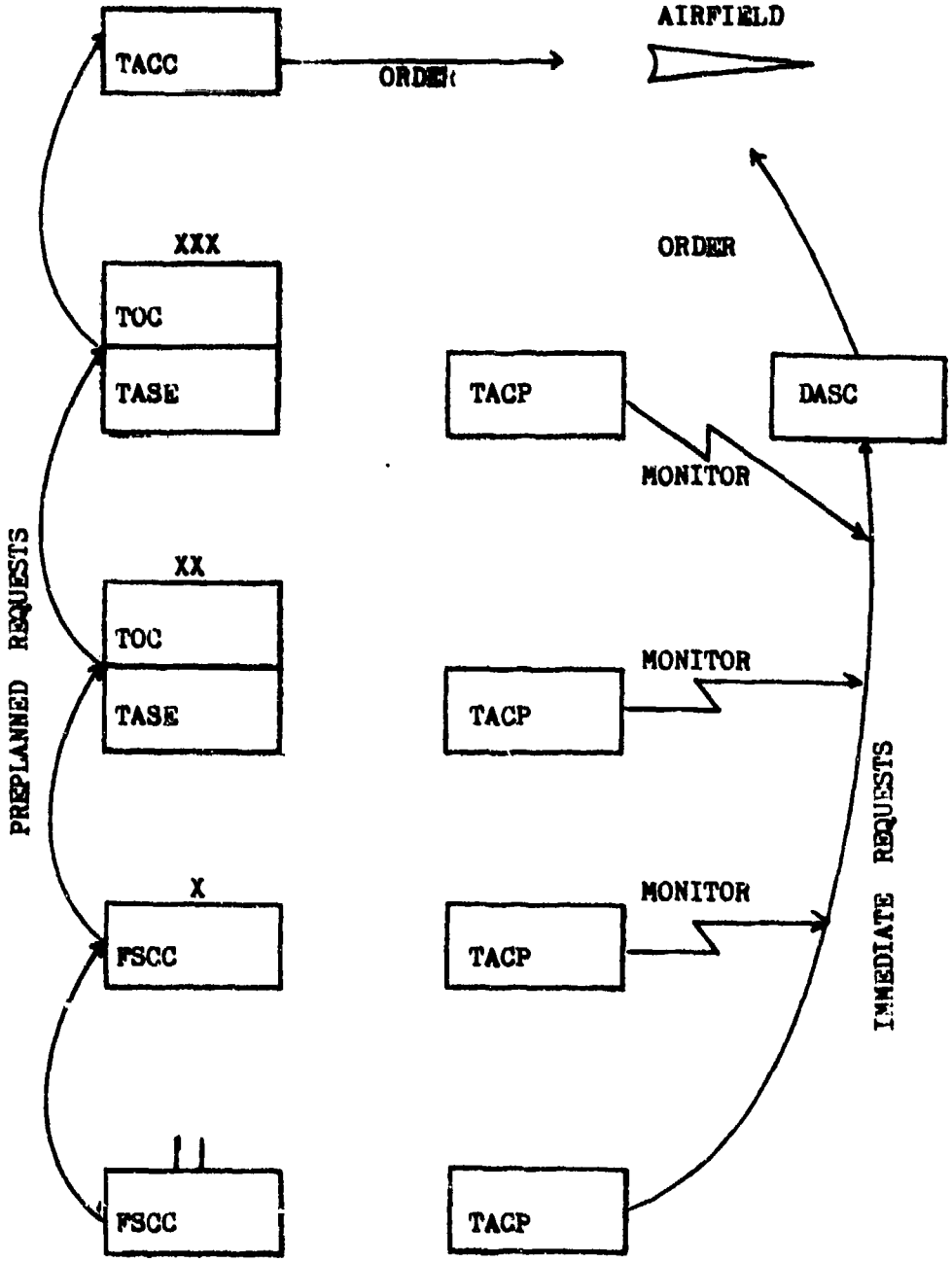

Figure 2. Close Air Support Request Channels

the mission to honor the request. The DASC has the flexibility to divert low priority preplanned missions or request add-on sorties from the TACC. The first option requires the approval of the supported Army unit. The TACP passes the immediate close air support requests to the DASC over the Air Force air request net.

INTERDICTION

Air interdiction operations are designed to isolate the battlefield by denying the "enemy combat forces the supplies, replacements, and reinforcements needed for continual operation and by limiting their freedom of movement" (64:4). This encompasses attacking the enemies lines of communication, rear area supplies, and resupply net, including roads, rail lines, waterways and air transportation. "Air interdiction is in direct support of ground forces when the targets attacked have a direct influence on their scheme of maneuver" (12:25). Armed reconnaissance by strike aircraft on interdiction missions in close proximity to friendly forces are employed in the same manner as a close air support mission. Close air support and interdiction missions can overlap in areas of responsibility through the wording of their respective missions. In fact, the overlap often occurs when tactical airpower is employed in the two roles. Interdiction missions can be managed in the same manner as preplanned and immediate close air support sorties. However, the JTF commander normally apportions a percentage of available tactical air sorties to interdiction

missions, based on the recommendations of the Army and Air Force component commanders.

During the Vietnam Conflict, close air support and interdiction missions were clearly delineated, due to the geography of the situation and the ground order of battle. In the future, the ground order of battle could be anticipated to be more conventional, as depicted in Figure 3. Interdiction missions normally occur beyond the Fire Support and Coordination Line (FSCL), as air operations inside the FSCL require close coordination with the ground units and thus are usually close air support sorties.

COUNTERAIR

Counterair missions, which include air defense of the battle area, are used to gain and maintain control of the air space important to the air/land battle. Air superiority is necessary in order to provide ground units freedom of maneuver. Air superiority is relative; it has a time or duration element and a geographic aspect.

> Counterair operations include closely interrelated offensive and defensive air actions. Offensive counterair operations are conducted to seek out and destroy enemy airpower as close to its source as possible. Defensive counterair operations include all measures taken to destroy or reduce the effectiveness of an attack by hostile aircraft or missiles after they are airborne (3:3-4).

TACTICAL AIR CONTROL SYSTEM

The missions of close air support, interdiction, and counterair are tied together and controlled by the TACS.

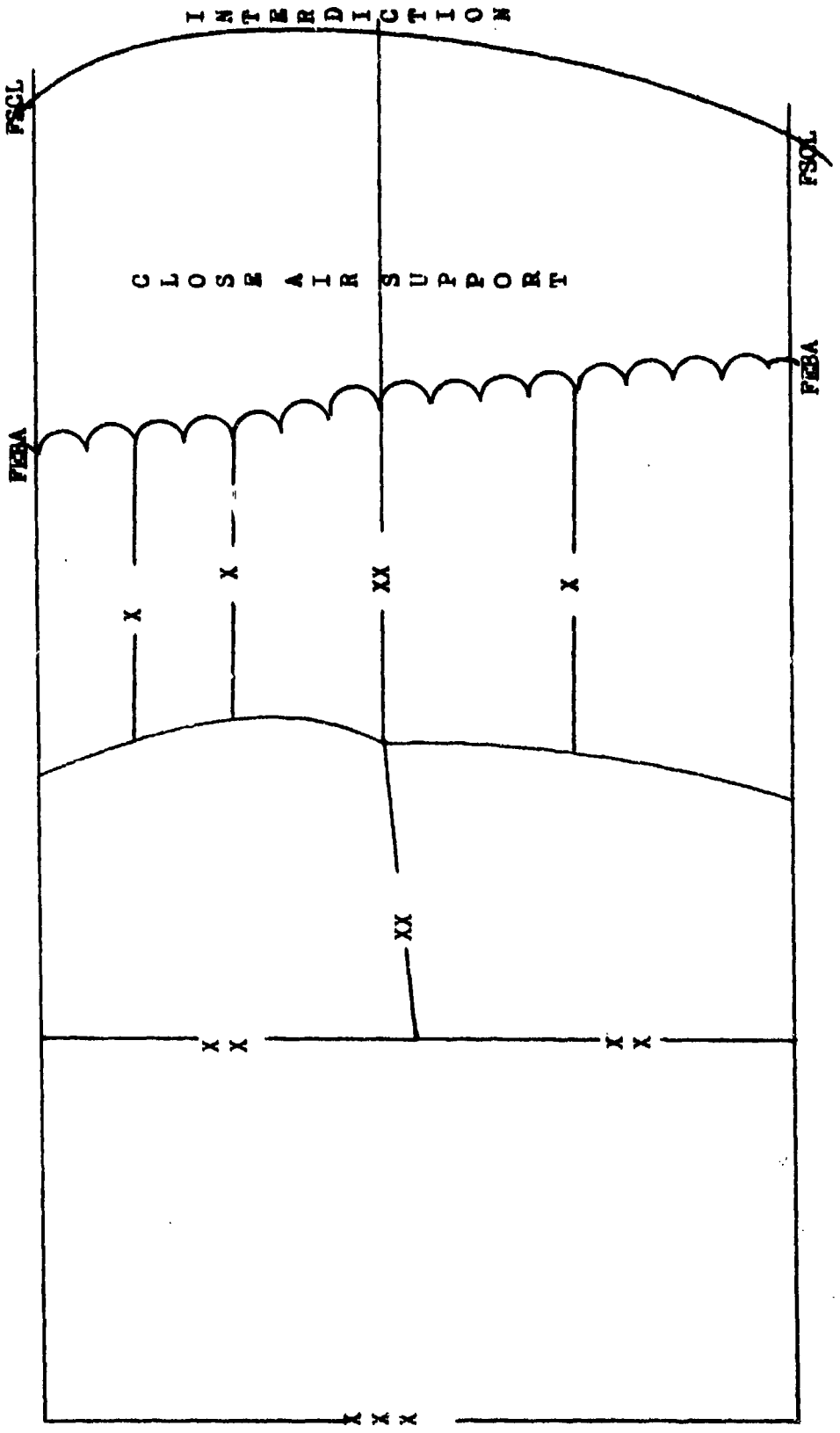

Figure 3. Anticipated Ground Order Of Battle

Through this system, the Air Force Component Commander can shift, redeploy, and concentrate forces to meet changing requirements. The system provides for centralized direction, with decentralized execution. Key elements of the system include close integration of operation, mobility, flexibility, and dispersion. The command and control of the system lies in the TACC, which is a part of the Air Force Component Command Post (AFCCP). The AFCCP plans, directs, and coordinates Air Force flight operations. The deputy for operations in the AFCCP exercises staff supervision of the TACC, which is the air operations center. Often, the AFCCP and TACC are located with the Army Component Command Post (ARCCP) at corps level.

The TACC is the key to the TACS and has eight principal tasks:

1. Provides centralized direction of the Air Force effort.
2. Plans and monitors current air operations.
3. Allocates the air effort and directs air defense operations.
4. Allocates the air effort for Army close air support, tactical air reconnaissance, and air interdiction requirements on the basis of the apportionment made by the Joint Force Commander.
5. Plans and directs counterair and air interdiction operations.
6. Plans and directs tactical air reconnaissance pertaining to counterair, air interdiction operations, and preplanned close air support.
7. Plans and commits preplanned and immediate close air support and reconnaissance missions.
8. Provides direct weather support to the AFCCP and weather information to the control and reporting post, DASC, ALCC, air traffic regulation center, and tactical units (64:16).

The Direct Air Support Center (DASC), which is subordinate to the TACC in operational command channels, has the primary function of providing a fast reaction capability for

Army immediate requests for close air support, reconnaissance, and airlift. The DASC is a 24-hour operation, with the ability to leapfrog in order to keep up with moving Army units. The director of the DASC controls the tactical air effort apportioned for immediate air support of Army operations. The specific functions of the DASC are:

> 1. Receives, plans, and coordinates Army requests for immediate close air support and tactical air reconnaissance.
> 2. Acts as an adviser to the Army commander. In this capacity, the director advises on the feasibility of requests for preplanned air support before they are forwarded to the TOC for final approval.
> 3. Advises the TACC of the air effort needed to satisfy Army close air support and tactical air reconnaissance requirements and requests additional sorties when necessary.
> 4. Alerts the ALSC to requests for tactical airlift that are being submitted through Army channels.
> 5. Directs the employment of the air effort allocated to the corps or division for immediate close air support and tactical air reconnaissance.
> 6. Operates and provides net control for the Air Force air request net.
> 7. Coordinates with the associated Army TASE on the integration of tactical air support with their fire and maneuver.
> 8. Exchanges intelligence and weather information with the associated Army TOC and the TACC.
> 9. Informs the TACP's and the associated TOC of current and planned air operations and provides overall supervision of TACP activities (64:17).

Although the TACC and DASC provide the key command and control link for the TACS and thus AGOS, the system must place strike aircraft under the control of a FAC. Figure 4 shows the aircraft control net from take-off to the point of FAC control.

Before examining some inherent weaknesses of the AGOS system, the AAGS which was discussed along with the TACS is

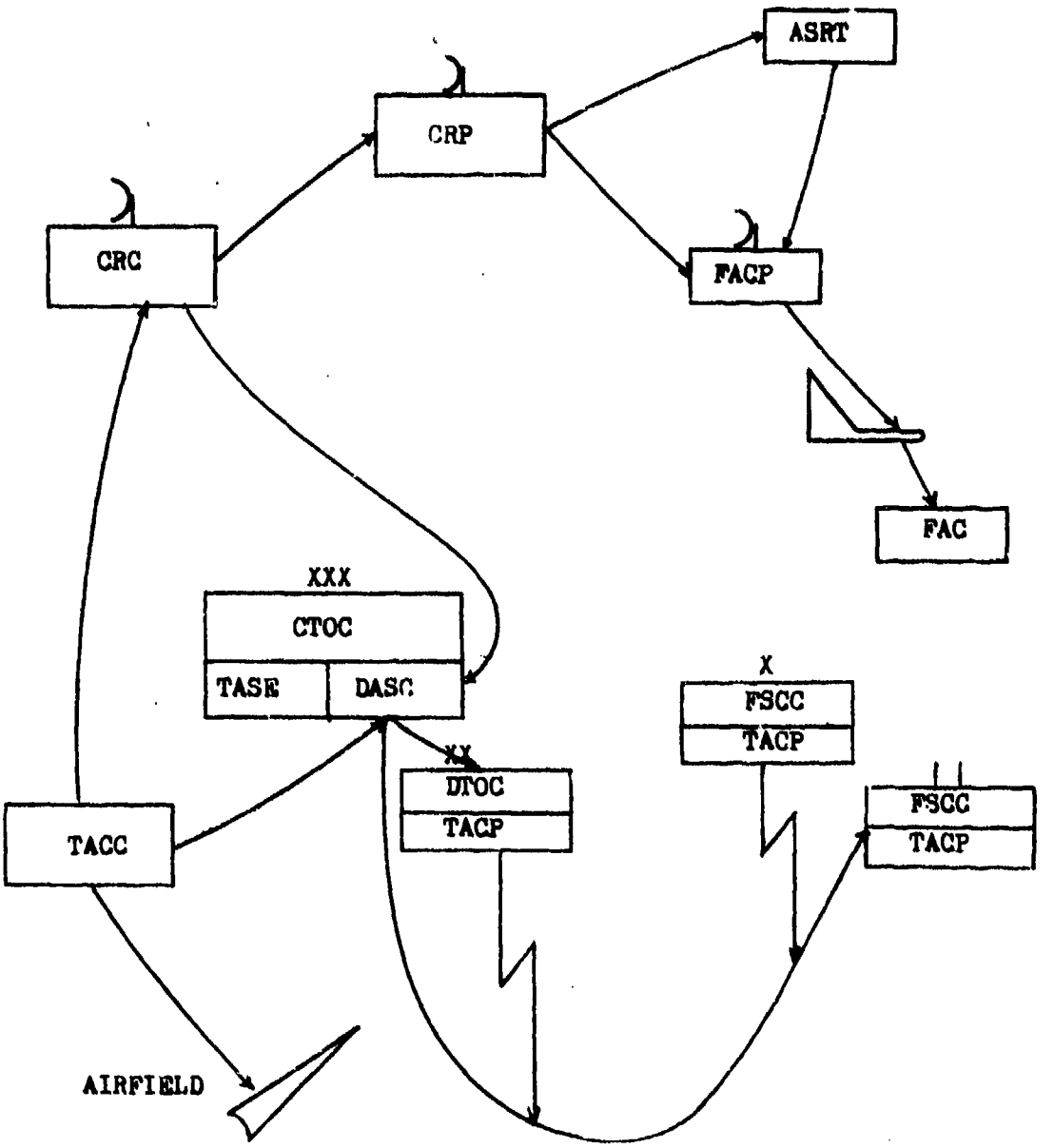

Figure 4. Close Air Support Net

detailed in Figure 5. "The AAGS is organized and equipped to determine Army requirements for, to recommend allocations of, and to plan, process, evaluate, and coordinate requests for tactical air support" (64:6).

AGOS SHORTFALL

A major weakness of the present AGOS is the FAC. The system is dependent on the FAC to control the final AGOS event, placing ordnance on target. As noted in Chapter 1, the present FAC aircraft may not survive the expected high threat of a modern air/land battle. Replacing the present FAC aircraft with a fighter aircraft, fast FAC, is a possible solution. Questions as to mission duration, area to be covered, and air-ground communications need to be addressed.

The present system places control of interdiction, counterair, and preplanned close air support in the hands of the TACC and leaves a separate control element for immediate close air support under the DASC. Although this provides for a fast response to immediate close air support requests, the system tends to decentralize control of available assets. When a modern air/land battle is fought, tactical air assets will be far fewer than during the Vietnam experience. Tactical airpower should be placed under a single control element that has total access to real time target intelligence generated by both the Army and Air Force. The JALBS system is a prescriptive model that could correct the shortfalls of the AGOS system.

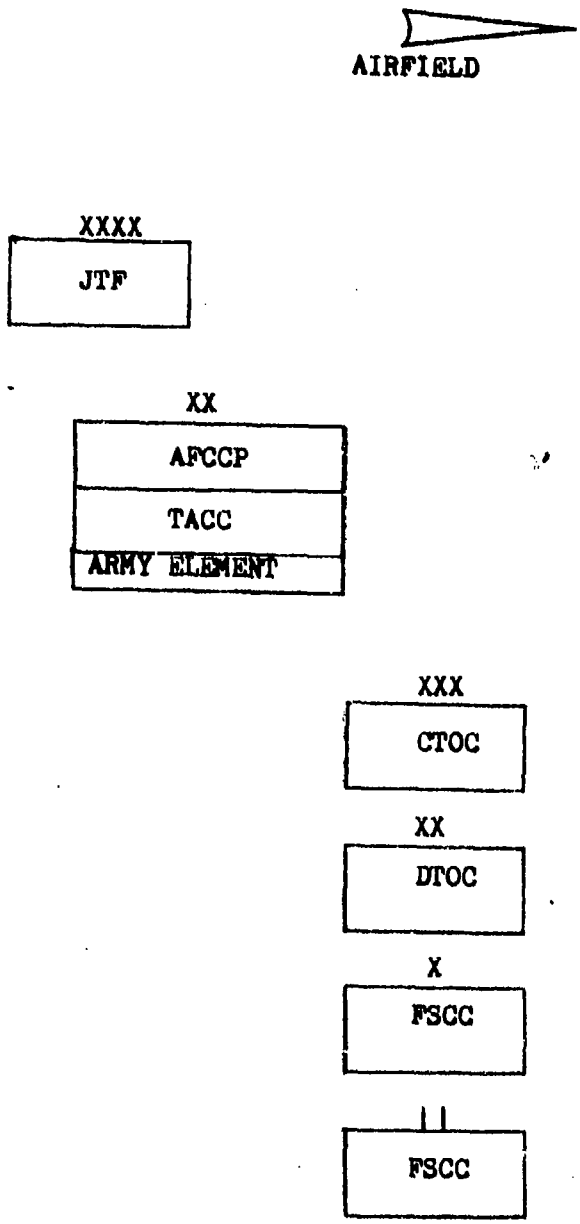

Figure 5. Army Air Ground System

Chapter 3

THE JOINT AIR LAND BATTLE CONCEPT

The principles of war highlight several areas where improvements in the existing AGOS may bring better coordination of the air and land forces. This chapter will explore possible prescriptive changes to the present AGOS that would result in a Joint Air Land Battle System.

Control procedures for the area in front of the forward edge of the battle area (FEBA) provide the major area for improvements. Figure 6 illustrates the problem.

The DASC has responsibility for the control of close air support missions between the FEBA and Fire Support and Coordination Line (FSCL). The TACC has overall control of tactical air but concentrates on control of interdiction missions beyond the FSCL. During a modern air/land battle there is a gray area of responsibility for attacking targets. The gray area consists of that portion of the battle area on either side of the FSCL where the DASC has control of one side and the TACC the other; yet, the DASC works in conjunction with the corps and the TACC with the JTF/AFFOR HQ. In general, the DASC attacks Army generated targets; and the TACC attacks Air Force generated targets. In a modern air/land battle, targets in the TACC/Air Force area of responsibility will exert a great influence on the Army ground commander's scheme of maneuver.

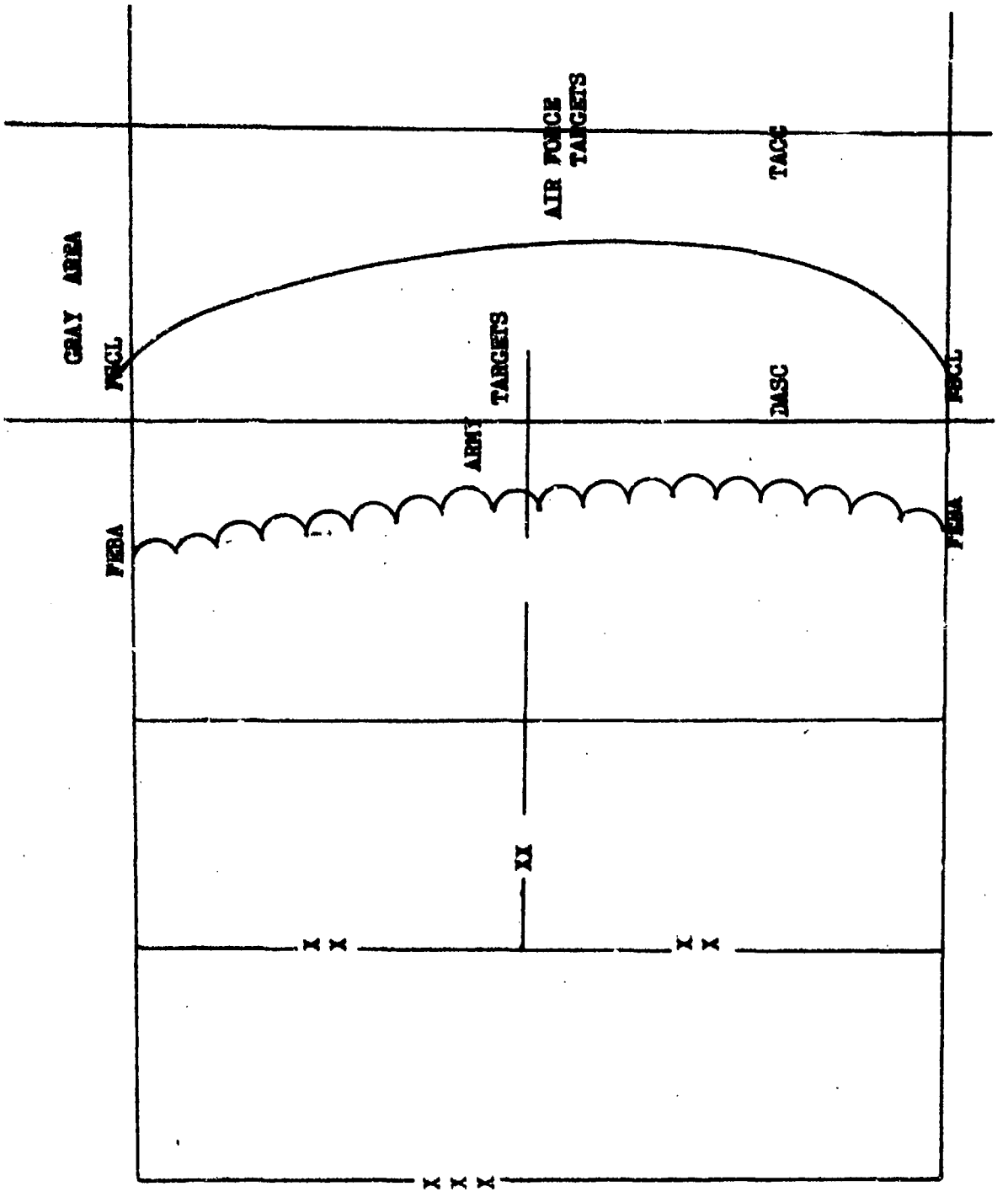

Figure 6. Air Ground Operations Sys m Gray Area

The mobility of modern ground forces expands the area having immediate impact upon front line ground operations. The TACC area of responsibility could contain Soviet first echelon artillery and all second echelon forces. The mobility of these forces is such that they could influence the battle in one to two hours (8:9).

On the FEBA side of the FSCL, Army generated targets, such as tanks beyond direct fire range, could best be attacked by tactical air using terminally guided weapons. However, tactical air operating in this area may require counterair escort and wild weasel (surface to air missile suppression missions) support. These resources are normally managed and directed by the TACC. Thus, there is no centralized management of the air assets that may be required.

The principles of war such as concentration of effort, control, simplicity, cooperation of all arms, and speed of action are not maximized when air operations are conducted in the gray area on either side of the FSCL. Efforts to solve this problem focusing on staff reorganization miss the key problem of tactical air target generation and control of tactical air resources.

A POSSIBLE SOLUTION

The easiest solution to the problem would be to establish a "no bomb line" that would separate Army and Air Force areas of responsibility. This solution has been examined by Army agencies, such as the Combined Arms Center, when it is

suggested that the Army assume responsibility for attacking the Soviet first echelon and the Air Force become responsible for locating and attacking the Soviet second echelon. At first, this approach looked feasible since the Air Force is equipped to locate and attack the second echelon. However, such a division of responsibility results in a separate ground and air battle, that divorces the two from achieving an integrated air/land battle to take advantage of mutually supporting capabilities.

The solution to the problem lies in not separating enemy forces but in redefining the areas of responsibility for target intelligence generation and engagement of those targets identified as important to the ground order of battle. The air/land battle would then become a ground battle where tactical airpower would be controlled and applied to support most effectively the ground commander's scheme of maneuver.

Figure 7 illustrates a proposed solution to eliminate the ambiguities surrounding the gray area. Since the ground commander is most concerned with that area directly in front and extending to his line of direct observation, the direct observation and fire line (DOFL) is inserted between the FEBA and the FSCL. The DOFL is envisioned as being 1.5 times the maximum range of organic Army direct fire weapons, assuming a clear field of fire. If the Tube Launched, Optically-tracked, Wire-command Link (TOW) is used as the longest range direct fire weapon, and its range is 3,000 meters, the DOFL would be 4,500 meters in front of the FEBA. The FSCL is generally drawn

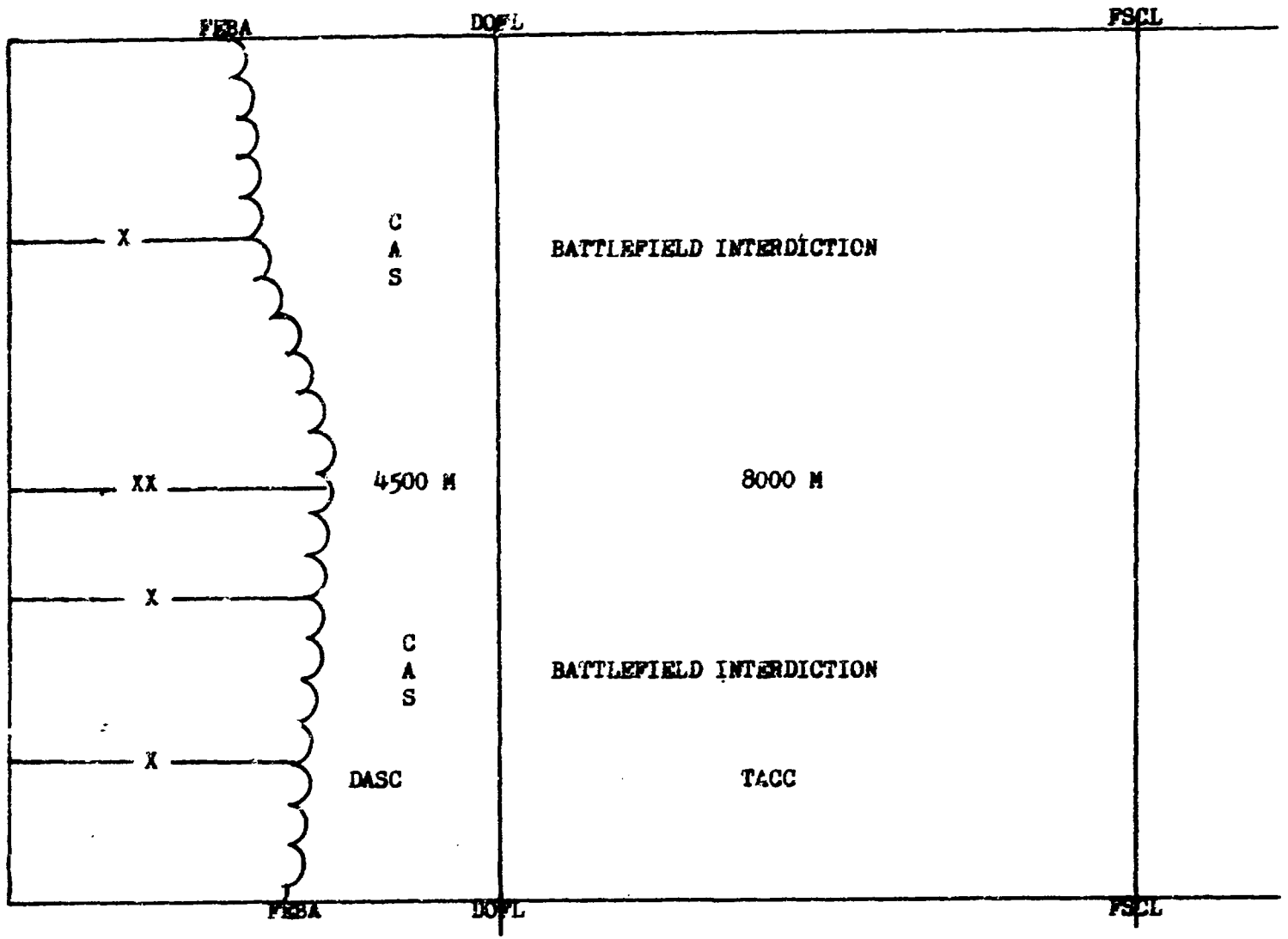

Figure 7. The Direct Observation And Fire Line

at the range of influence of the 155mm howitzer. Then, if the 155 has a range of 18,000 meters and is positioned 1/3 of that distance from the FEBA, the FSCL could be 12,000 meters from the FEBA.

How then would the DOFL be used? The responsibility for target generation inside the DOFL would rest with the Army ground commanders. Procedures for requesting close air support missions would remain the same and would be controlled by the DASC, with one exception. That exception is the scheduling of preplanned tactical air.

Instead of breaking down preplanned tactical air sorties by a specified time on target, a block time frame would be used. For example, a smaller percentage of tactical air sorties would be apportioned to immediate air strikes and more would be scheduled to respond during a block time frame. The dynamic nature of the modern battle makes it virtually impossible to predict 24 hours in advance that at 1015 on the following day of battle the Army will require a two ship mission loaded with air to ground missiles. However, the Army ground commander could reasonably foresee the need for tactical air support against tanks between 0800 and 0930 of the next day. With this degree of flexibility for requesting preplanned tactical air, the ground commander could plan for the use of airpower to support a scheme of maneuver. The coordination procedures for preplanned sorties would remain the same as those outlined in Chapter 2, but the request for the scheduled sorties would go through the Air Force communications net similar to the request

for immediate air strikes. This procedure could allow the TACC the flexibility of diverting unused air assets to fill the preplanned request or scramble awaiting aircraft. If the preplanned sorties are not needed, due to a change in the ground battle, then the TACC could divert the sorties to other targets or hold the sorties on the ground.

The above proposed procedure for use of preplanned CAS sorties would preclude the unnecessary expenditure of tactical air when no targets are available, as often happened when the old procedure was used in SEA. With a limited number of air assets available, proper utilization of tactical air firepower becomes a necessity.

THE FAC FOR CAS SORTIES

By placing the DOFL in front of the FEBA and allowing the ASC to control tactical air missions between the FEBA and DOFL, a major limitation of the old procedure is corrected. As discussed in Chapter 2, the slow moving airborne FAC may well be suppressed by the Soviet surface to air missile (SAM) net that envelopes the area on either side of the FEBA. CAS sorties between the FEBA and DOFL that require coordination for fire and maneuver with ground units, could be controlled by a ground FAC. Beyond the DOFL, tactical air strikes would require no direct contact with ground units for fire and maneuver. The DOFL is not a "no bomb line," as coordination with the Army for air strikes will be affected at a higher level than the Army unit in contact. Coordination procedures will be addressed later.

DOFL and Artillery Fires

No changes in the present procedures for artillery fire between the FEBA and DOFL is suggested. Artillery fire into the area between the DOFL and FSCL will require no coordination with Air Force elements except for those targets acquired by the Air Force and designated for attack by artillery. The procedures for passing Air Force target intelligence between the DOFL and FSCL to the Army will be covered later in this chapter. The unrestricted use of tactical air and artillery in the area between the DOFL and FSCL is a key element of the JALBS system that results in effectively massing available firepower in minimum time.

AIRSPACE MANAGEMENT

The control of the airspace between the FEBA and DOFL would be the responsibility of the Air Force, with the exception of artillery fire. The DOFL itself would become an air defense control measure. The airspace from the DOFL to the divisions rear area would be a weapons free zone, except for limited fly-through corridors for tactical air or until brigade size airspace blocks are set aside for CAS sorties in the area between the FEBA and DOFL. The DASC would be the responsible agency. The airspace beyond the DOFL would be a weapon held area for Army air defense artillery (ADA) except when committed by Air Force control agencies.

FUSION OF TARGET INTELLIGENCE

Prior to a discussion of tactical air operations beyond the DOFL, an explanation of how target intelligence would be generated is necessary. As pointed out earlier in this chapter, a major limitation of the present AGOS system was the division of target intelligence in the gray area. Between the FEBA and FSCL, target intelligence and target nomination was the responsibility of the Army. Beyond the FSCL, the responsibility rested with the Air Force.

The present Air Force organization is so structured that, with minor modifications, the responsibility for target intelligence and nomination from the DOFL forward could be handled by the Air Force and augmented with existing Army systems. Figure 8 illustrates the present Air Force component commander's organization. The Combat Intelligence Center (CIC) contains a fusion division with functional responsibility for providing a focal point for data from near-real time collection systems and sources (see Figures 9 and 10). The CIC also analyzes, correlates, and filters near-real time information in order to nominate targets forward of the FSCL. Target intelligence is then collected between the FEBA and FSCL; and, thus, the CIC fusion division could perform the necessary analysis to nominate ground targets forward of the DOFL. As noted earlier, this would nominally add only 7,500 meters of area rearward of the FSCL for analysis.

Army and Air Force intelligence surveillance systems provide overlapping coverage of the battle area forward of

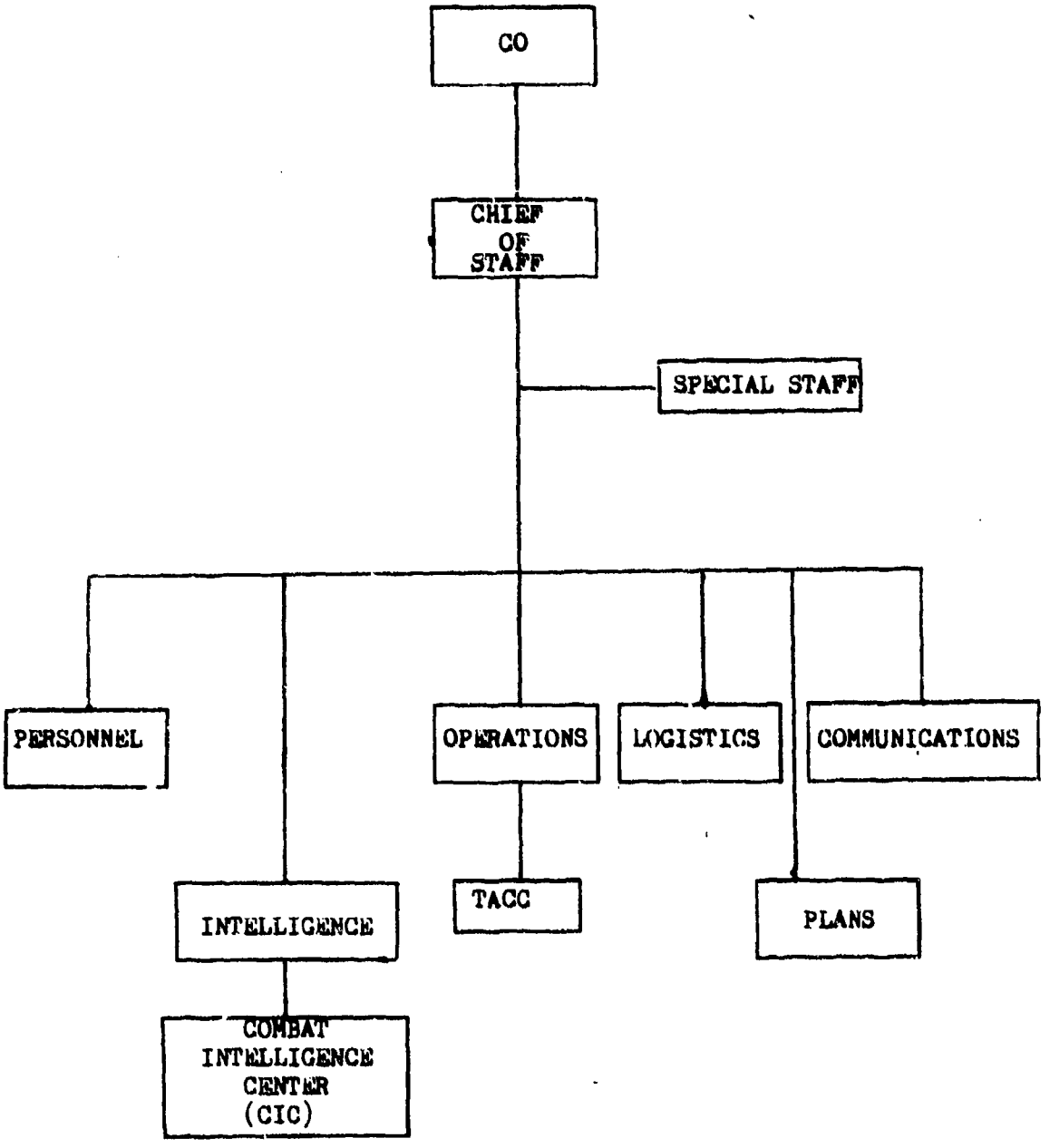

Figure 8. Air Force Headquarters Organization

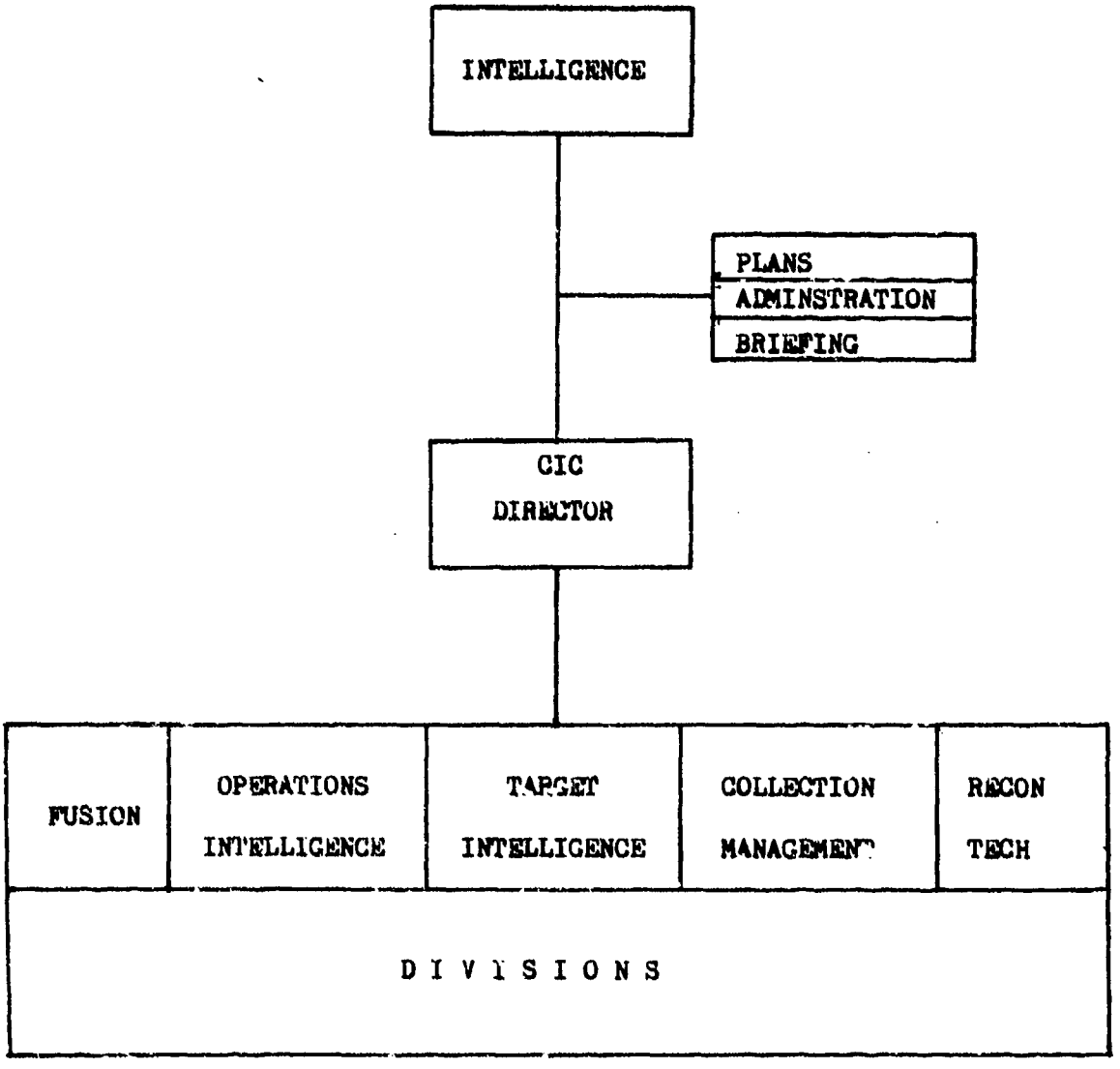

Figure 9. Manual Combat Information Center

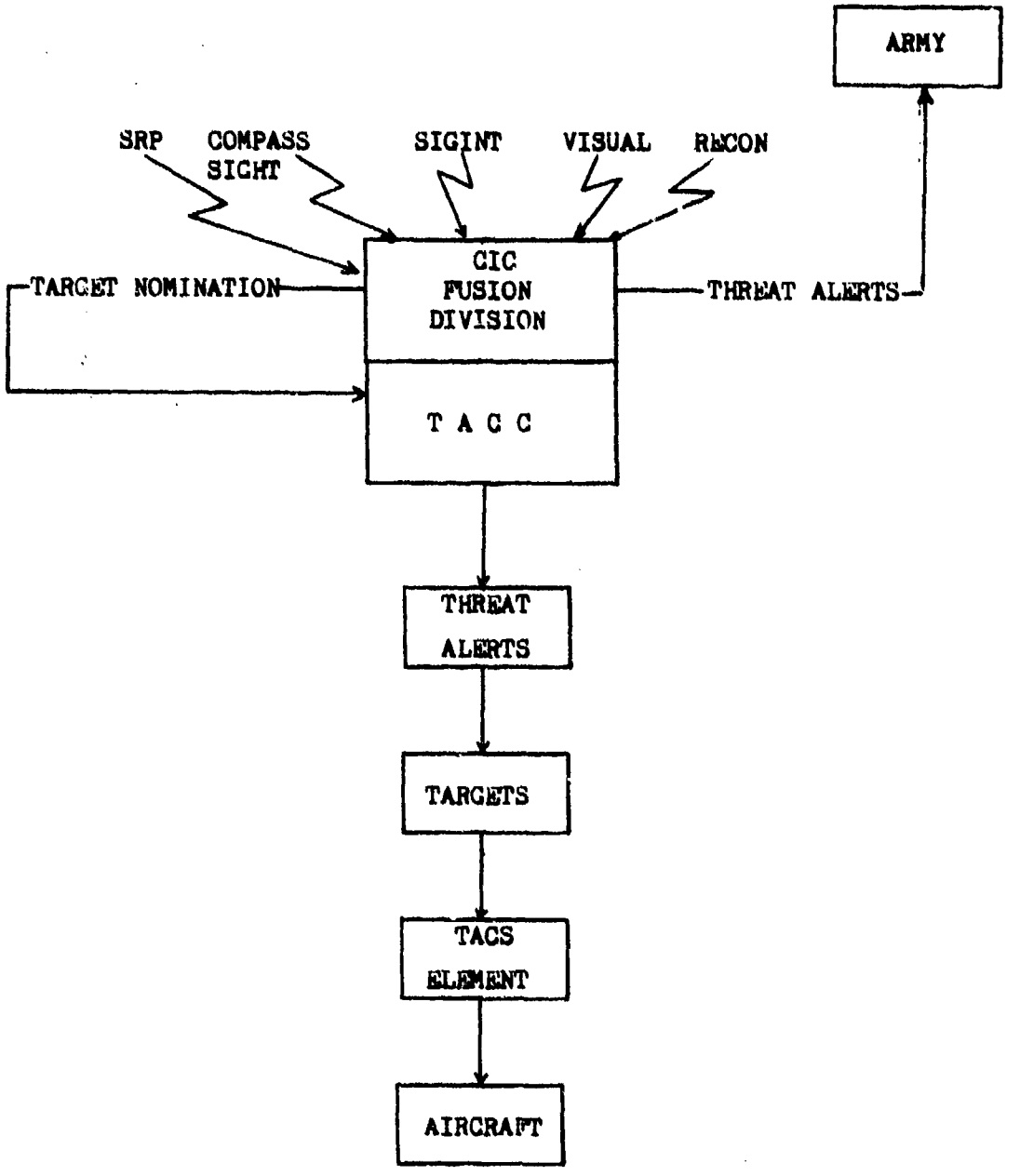

Figure 10. Fusion Of Intelligence

the DOFI. However, under the present AGOS structure, there are normally only two points of interface for the passage of joint intelligence. One point of interface is the TASE, which is a part of the Corps Tactical Operations Center (CTOC) (see Figure 11). Included in the manning of the DASC are two intelligence targeting officers. These officers provide the Air Force target intelligence interface with the Corps G-2. The interaction is limited to the passage of Army intelligence to the TACC using Air Force channels and the passage of Air Force air strike results to the Corps G-2 and to the TACP in units below corps.

The other interaction exists at the CIC where the Army can provide intelligence officers to pass information garnered by Air Force systems into Army channels.

"The devastating lethality of modern weapons and the vastly improved mobility of instruments of warfare have dramatically increased the tempo and depth of modern combat" (9:1-4). In order to track and properly analyze the modern battle, intelligence fusion between the Air Force and the Army for target nomination and raw intelligence must be established. "Practical distinctions about gathering, processing, and disseminating data must be eliminated in favor of the demands of decision-makers for near-real time information" (9:1-7). Often Air Force reconnaissance and intelligence gathering systems range Army collection systems. Yet, the Air Force is gathering intelligence on the ground battle that is vital to Army decision-makers.

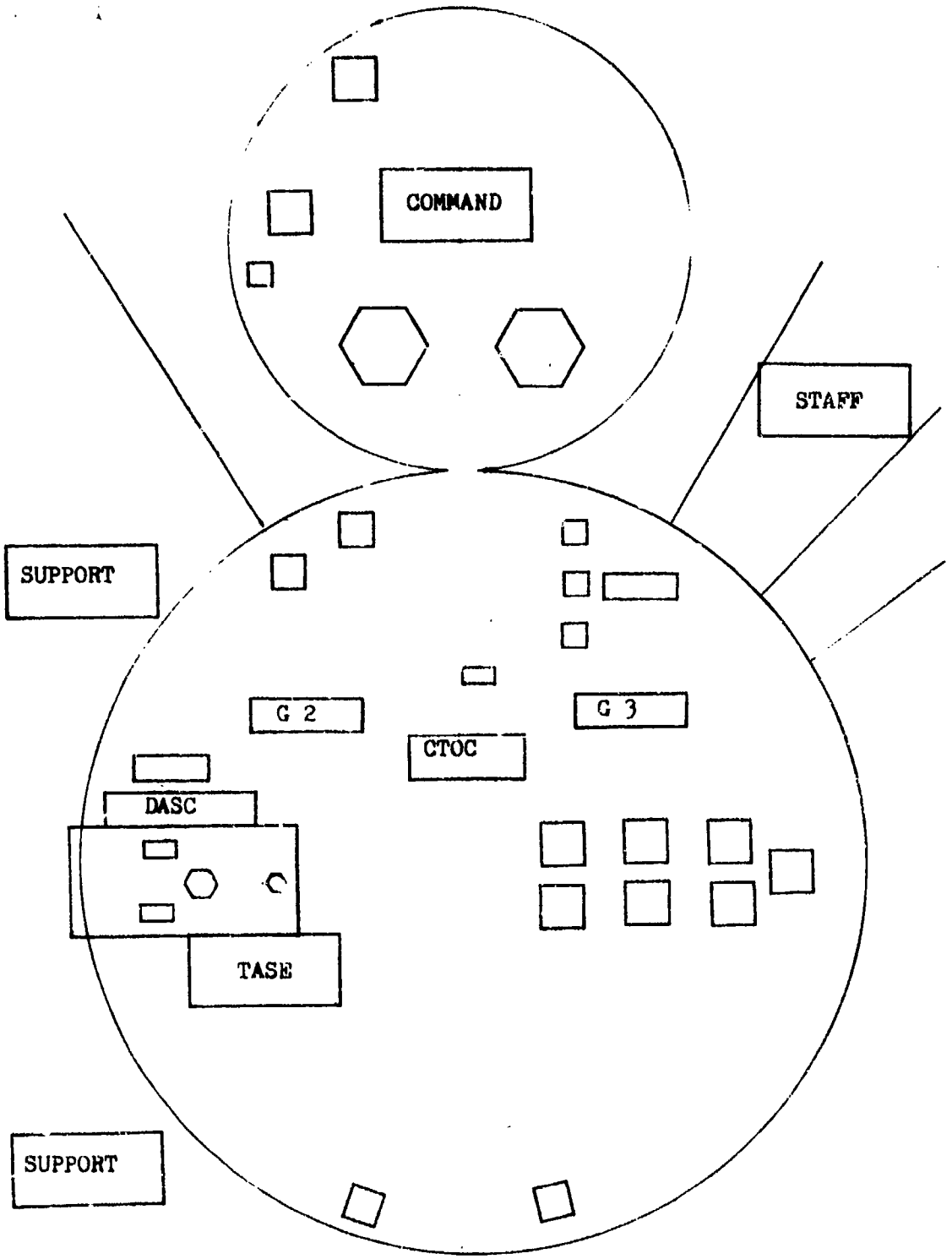

Figure 11. Corps Tactical Operations Center

Target intelligence should be fused in such a manner that the best combination of fire and maneuver can be applied to destroy the enemy. Target intelligence fusion should take place at a level of command that can blend Air Force and Army firepower. Both the Air Force and the Army presently provide target nomination through their separate respective channels. Terminating target nominations at a Joint Combat Control Center (JCCC) and not at the TACC and CTOC could provide a fusion for separately acquired target intelligence. Figure 12 shows the relationship of the JCCC to the separate existing agencies of the present AGOS.

The JCCC can be a separate unit or can be located within the TACC or CTOC. Important to the JCCC is its manning and functional responsibilities. The JCCC should be manned with senior decisionmakers from both the Air Force and the Army. The Air Force element of the JCCC could be the Air Force Deputy Chief of Staff for Operations and a support element, while the Army element could be the Corps G-3 and a supporting element from his staff. The JCCC would control Air Force and Army firepower by directing that the TACC attack a nominated target with tactical air or that the Army attack a nominated target with Army organic firepower. In order to perform this task, the JCCC must be manned to provide the battle staff of the JCCC with the ground order of battle, the air order of battle, and the electronic order of battle. The JCCC is envisioned as being involved in current operations and not in plans or future operations. Although the planning functions

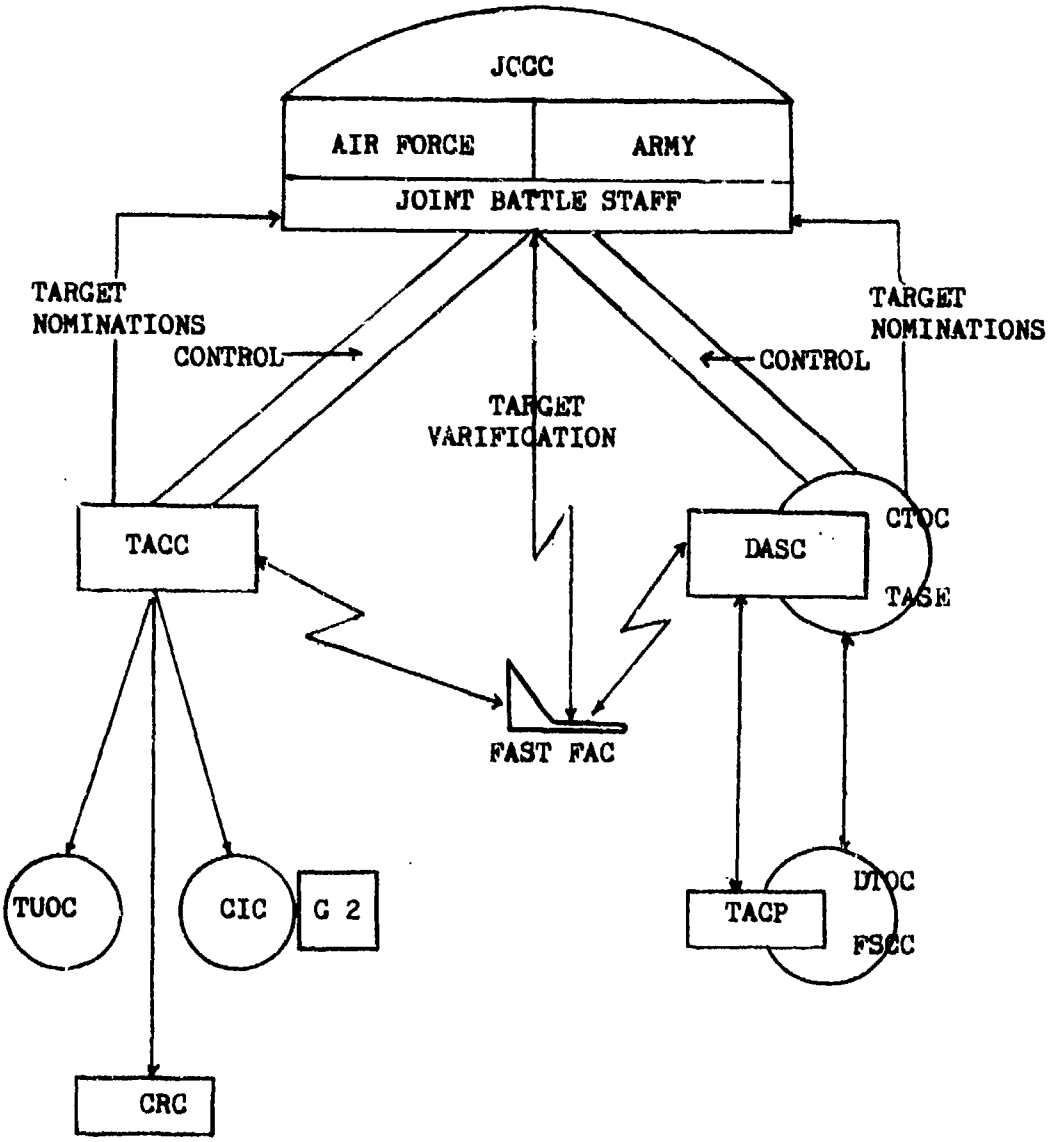

Figure 12. Joint Combat Coordination Center Command And Control Net

could be incorporated in the JCCC charter, it would duplicate the TACC and CTOC planning function. The TACC and CTOC should maintain their present planning functions but expand the crosstell of intelligence.

In order to increase the intelligence crosstell between the Air Force and Army, the following changes in manning are recommended: The Army should add a G-2 element to the Air Force CIC in order to pass Air Force intelligence information into Army G-2 channels; the Air Force should increase the DASC intelligence element to provide for a flow of Army intelligence directly into the CIC; consideration should be given to placing the CIC under the control of the TACC.

The intelligence passed between the CIC and CTOC should not be raw intelligence but rather information that has been analyzed, correlated, and filtered from near-real time sources of each service. This would provide each service with hard intelligence without increasing the demand for analyzing, correlating, and filtering raw intelligence. There is no intent in the prescriptive model presented in this study to fuse raw intelligence sources.

THE AIR/LAND BATTLE FORWARD OF THE DOFL

> Old distinctions between interdiction and close air support are becoming increasingly blurred. It is becoming ever more evident that tactical airpower makes its most important contribution to the division battle not by piecemeal attack of targets locked in battle with front line elements, but in the target-rich environment immediately to the rear of engaged forces. Increased accuracy and lethality of air weapons have made them more critical to the rapid response required to meet the challenge of increasing ground mobility (9:1-7).

The JALBS concept can correct the "old distinction" between interdiction and close air support. As discussed earlier, the gray area surrounding the FSCL is the source of the "blurred distinction" between interdiction targets and close air support targets. The proposed revision of tactical air operations beyond the DOFL must insure that the proper targets are destroyed by tactical air in the "target rich" environment beyond the DOFL. Thus, the JCCC has been added to the present AGOS to perform the mission of insuring that tactical air destroys those targets that most influence the ground battle. The devastating effect of massed tactical air and Army firepower could well be the key to winning "the first battle." General Robert Dixon, Commander of Tactical Air Command, defined the effect that massed firepower could have on the tactical environment when he stated:

> The Army and the Air Force must integrate their efforts. When we effectively mass and employ the combined firepower assets of both Army and Air Force at the critical point of the battlefield, we will have the quantitative advantage, not the enemy. When we shift our tactical airpower from an area where the job is done, we can achieve a quantitative advantage in a new location (48:23).

The JCCC is the catalyst to achieve the necessary control to mass firepower, for the JCCC will allow the Army to advise the Air Force on the ground targets the Army considers necessary to be destroyed.

In order for the JCCC to function as a battle staff directing firepower against targets forward of the DOFL, the JCCC must have the target intelligence and situation intelligence discussed earlier in this chapter, as well as a maximum

number of tactical air sorties. A maximum number of tactical air sorties is necessary because the majority of targets will be vulnerable only to tactical air strikes. This is because of the limited range of artillery and the limited observation capability of ground forces in a modern air/land battle. To maximize the number of air sorties available, two changes are necessary to the present apportionment procedures for tactical air in a contingency operation.

First, the amount of tactical air on ground alert should be reduced. This reduction may be justified by reducing the area that immediate air strikes would attack; that is, between the FEBA and DOFL, and by allocating more organic artillery fires to the area in front of the FEBA, where observation is available for the adjustment of fires. The need to reduce the number of aircraft on alert is emphasized when consideration is given to maximizing the total number of sorties available for JCCC use. Aircraft on alert cannot be flown and rearmed on a planned basis. With limited air assets in a target-rich environment, efforts to increase available sorties by reducing aircraft on ground alert has the potential of increasing the total firepower available.

The second change to the present system of tactical air apportionment deals with the use of preplanned air strike sorties. Since the prescriptive model for handling air sorties forward of the DOFL makes no distinction between air strikes forward of the DOFL and strikes forward of the FSCL, there is no requirement for apportioning a prescribed percentage of

sorties for Army use between the FEBA and FSCL. All tactical air sorties not apportioned for immediate air strikes then would be available to Air Force planners to use in a manner to best support the ground commander's scheme of maneuver. Such a procedure would give the JCCC the maximum number of sorties in which to influence the battle. The distinctions between sorties applied to deep interdiction, interdiction, battlefield interdiction, preplanned CAS, and counterair then becomes meaningless, for the JCCC will control these missions so that the greatest influence on the ground battle would be effected. Such flexibility is necessary if the Air Force is to be used effectively and in compliance with the principles of war. In order for the JCCC to provide the necessary concentration of effect, control, simplicity, cooperation of all arms, surprise, speed of action, and seizing the initiative, the principle decisionmaker at the JCCC should be the representative from the Air Force commander, with the Army representative acting as an advisor on targets that most influence the ground scheme of maneuver.

With the above changes in the tactical air apportionment procedure, it would become necessary for the Army to identify what types of targets forward of the DOFL the Air Force is to destroy, supress, or neutralize. Once identification is determined, the Air Force planners would schedule aircraft and aircraft ordnance loads to best fit the Army requirements.

Airspace management forward of the DOFL would remain the responsibility of the Air Force, as would overall air defense of the theater of operation. The joint airspace management procedures now being developed by the Army and Air Force would not be in conflict with the JALBS concept presented in this study. However, it is not the intent of this study to directly address airspace management. Important, however, to the JALBS concept is the unrestricted use of Army artillery into the area between the DOFL and FSCL. Targets fired upon in this area should be reported to the fire support element at the CTOC. The CTOC would then pass this information to the JCCC and CIC.

THE KEY ELEMENT OF THE JALBS CONCEPT

"To be seen is to be killed" has long been an axiom of air warfare. The phrase, "What can be seen can be hit, what can be hit can be killed" has grown into vogue in the Army. Both phrases demonstrate that to destroy any target, air or ground, the target must be located first. To date, the single, most effective target locator is the individual soldier or pilot. Beyond the 1970's, the human eye may be replaced by more accurate, immediate-reaction, man-made systems; but, until the present intelligence systems become less time consuming and more accurate as to target location, size, composition,and intent, the man on the ground or in the cockpit is the best source of operational target information. The human eye - man combination is the best source of confirmation

for the near-real time target intelligence inputs from the CIC or CTOC to the JCCC.

From the FEBA to the DOFL, observation and human intelligence gathering is relatively simple, although the effects of night operations and adverse weather and terrain will have a limiting effect. Beyond the DOFL, visual confirmation and location of targets is limited to fast moving fighter aircraft crews. Survival of the present, slow moving FAC aircraft was discounted in Chapter 2.

Until such time as new systems are brought into the inventory that can quickly locate targets and can immediately confirm them, a need exists for target location and confirmation by fighter aircrews. Missions dedicated to the location and confirmation of targets in high-threat areas were flown in Southeast Asia. These missions were referred to as fast FAC missions.

Designated fast FAC missions should be made available to the JCCC to find and confirm targets. The exact location of large concentrations of enemy artillery and armor should be confirmed prior to the commitment of tactical air into the high-threat environment that exists beyond the DOFL. The reaction time of these fast FAC missions should be reduced by keeping such missions on airborne alert and in direct communication with the JCCC through the CRC or TACC.

Besides the location and confirmation of targets, the fast FAC could provide strike control, artillery fires adjustment, and target designation with laser devices for laser

guided munitions. Post strike bomb damage assessments would be a critical intelligence item that the JCCC could receive from the fast FAC. The degree to which a target is destroyed is vital information in determining the necessity for re-targeting and diverting airpower to other lucrative targets.

The survival of the fast FAC forward of the DOFL could be aided by the use of JCCC directed artillery suppression, air defense electronic warfare suppression, and counterair escort. Highly experienced and well trained aircrews would be necessary for the fast FAC missions. The fast FAC aircrews must also be familiar with the new family of precision guided weapons in order to properly advise the JCCC on the correct munitions for the target location, terrain, weather, defenses, and disposition.

The JCCC could use the fast FAC in the following manner: Once several targets have been tentatively located, a fast FAC could be directed to confirm the targets. The JCCC could then direct appropriate supporting missions for the fast FAC sortie, such as air defense artillery suppression fires. With target confirmation passed by the fast FAC aircrew, the JCCC could then direct the necessary firepower package to destroy the targets. Depending on the situation, the firepower package could range from simple artillery fires to a combined air strike artillery package with supporting wild weasel, EW, and counterair sorties. The fast FAC could well be the best source for the location of enemy targets beyond the DOFL such as second echelon forces.

The ability of the fast FAC to locate or confirm multiple targets will provide the capability for strike aircraft to attack more than one target area during a mission. The high threat environment, in which the strike aircraft will be operating may not allow multiple passes over the target area. The F-4E, which is capable of carrying six AGM-65 air to ground missiles, will not expend all weapons on one pass. Rather than returning the F-4E to its airfield, the JALBS concept would target the F-4E against multiple targets in different areas in order to maximize the F-4E firepower potential on a given sortie.

CONTROL PROCEDURES

The mobility of modern battle requires the DOFL to be a flexible control measure. Control of the DOFL during an offensive or defense phase of battle would be through on-call consecutive lines. Determination of the DOFL would be the responsibility of the Army. The FEBA will not be a straight line trace in either the offense or defense throughout a corps area of responsibility. The DOFL should be drawn in a straight line in front of each brigade on line. Where possible, adjoining brigades should have a continuous DOFL. Since the DOFL is a control measure for air strikes and intelligence, the location of the DOFL is important to all levels of command. The brigade commander is envisioned as having the responsibility of requesting a new DOFL from the division commander. In this manner, the G-2 and G-3 of a division could influence the

placement of the DOFL in order to assure continuity in the division area and with flanking divisions.

Division and corps may wish to operate with such activities as long range patrols beyond the DOFL. In order to provide adequate control measures to ensure that friendly units operating beyond the DOFL are not subject to air strikes, the JCCC should be provided with the location of such units. Once the JCCC has the location of friendly units operating beyond the DOFL, air strikes and JCCC directed artillery fires will be directed away from the friendly units or be called in to support the friendly units.

SUMMARY

The JALBS system is a prescriptive model to update the present AGOS command and control relationships. The requirement for the concept was two-fold. A corps size contingency force, with a supporting Air Force element that faces a Soviet equipped and doctrine-oriented foe, could be outnumbered by five to one or greater. Second, the present AGOS introduces a gray area for target destruction on either side of the FSCL. The JALBS system provides a vehicle to maximize the available tactical air assets by reordering the present tactical air apportionment procedures, by placing all tactical air under the control of the JCCC, and by streamlining target intelligence procedures. The JALBS system eliminates the gray area surrounding the FSCL and provides a structure for the ground commander to influence tactical air targeting on a real-time basis.

The JALBS concept introduces procedural changes for target nomination, that allow the massing of friendly firepower. The fast FAC is a key element of the concept, for the fast FAC provides the real-time confirmation of target intelligence derived from near-real time sources. The increase in situational intelligence crosstell is urged between the CIC and CTOC. The exchange of raw intelligence is not recommended, only processed intelligence. The relationships between agencies below the JCCC, such as the CTOC, CIC, DASC, and TACC remain unchanged in the JALBS system. Chapter 4 will analyze the JALBS system compared with the present AGOS.

Chapter 4

INTRODUCTION

The next battle in which United States armed forces engage will most probably be won or lost with on-hand resources, for time will permit no other option. The principles for the conduct of the next battle will not change, but the methods must. To operate effectively in the next arena and to win the first battle, new methods must be developed to employ the forces available in order for the forces to be used with maximum effectiveness. This is a great challenge but a reachable goal. "The probabilities that the United States military forces will encounter a permissive operational environment in the future appear to be slight" (9:55). Therefore, the new methods to apply old principles must be adaptive to the mobility and lethality of the modern battle ground. The comparison of the JALBS concept to the present AGOS, in this chapter, will examine many parameters of merit in order to derive a meaningful evaluation of the relative effectiveness of each system. The first comparison that will be explored is the ability of each system to support the principles of war.

Chapter 1 introduced the principles of war that will be used in this chapter. However, before proceeding with an evaluation of two tactical air control systems based on the principles of war, the following points need to be considered.

First, although many words applicable to the principles of war are found throughout present United States Air Force (USAF) doctrine, no official USAF publication references the classic principles of war used in this thesis (24:43). There exists a precedence, however, for applying the principles of war to airpower.

> We have yet to see a war in history totally won by some new or terrible instrument of technology or science. Conceding the nuclear holocaust which brought Japan to the peace table, all other wars in history have been won by the application of men, machinery, morale, and equipment. Even the Japanese campaign primarily consisted of such factors. Far-sighted airmen will see the value of the sound application of those historical principles of war and their application to the aerospace medium. The basic principles do not change (24:43).

Each user of the classical principles of warfare can write his own list; however, those normally attributed to Clausewitz are considered the original list. Table I shows a list of the principles of war used by Clausewitz, the United States Army, British Royal Air Force, and this thesis. Prior to the removal of a direct reference to the principles of war in USAF publications, the USAF used the following: Objective, Offensive, Concentration, Economy of Effort, Flexibility, Surprise, Security, Cooperation, and Control. This chapter, then, will examine the two tactical air control systems as to how the systems support the principles of war, for there is adequate evidence that airpower is governed by the principles set forth in this thesis.

The second evaluation of the two systems will examine how each system supports the momentum of time and space. The

Table 1

Principles of War

Clausewitz	U.S. Army	Royal A.F.	Thesis
Objective	Objective	Aim	Seizing the Initiative
Offensive	Offensive	Offensive	
Mass	Mass	Concentration	Concentration of Effort
Economy of Force	Economy of Force	Economy of Force	
Movement	Maneuver	Flexibility	Speed of Action
Surprise	Surprise	Surprise	Surprise
Security	Security	Security	
Simplicity	Simplicity	Administration	Simplicity
Unity of Command	Unity of Command		Control
		Cooperation	Cooperation of all Arms
		Morale	

measure of time momentum will be applied to each system in order to discern which system is more responsive to time. In examining space momentum, accuracy, rate, number of targets struck, and concentration of power will be applied. Time and space momentum are quantifiable items and will thus aid in evaluating the two systems.

A third evaluation of the systems will involve an analysis of a war game using notional forces employed in a Joint Task Force (JTF) of Army and Air Force elements against a force using Soviet equipment and doctrine.

PRINCIPLES OF WAR

Siezing the Initiative

Both the present AGOS and JALBS concept deal with the employment of airpower. For one system to be more effective than the other, that system must permit, to a greater degree, the freedom of operation of airpower. The freedom of operations in airpower allows airpower to exploit speed, range, altitude, and maneuverability to a degree not possible by other forces. Unimpeded by natural barriers imposed by land and water masses, airpower can conduct operations rapidly, over great distances, in any direction, and enjoy multidimensional maneuvering within the medium of the air mass (2:2-1). These certain distinctive capabilities should not be hampered by the control system that effects airpower operations.

Siezing the initiative or the offensive is the first principle of war that the two control systems, AGOS and JALBS,

must support in order to maximize the distinctive capabilities of airpower. "Offensive action offers the advantage of the initiative, which permits the selection of objectives as well as the time, place, and weaponry for attaining objectives" (2:2-2). As discussed in Chapter 2, the present AGOS places central control of all tactical air assets under the TACC. However, due to the present apportionment procedures, the TACC cannot control the time and place of employment for tactical air apportioned to Army use from the FEBA to the FSCL. The Army, through the DASC and allocation process, determines not only the objective for tactical air used between the FEBA and the FSCL but also the time and place.

The speed and destructive power of tactical air portend that, in a high threat, modern air/land battle, the initial offensive battle may be immediately decisive (2:2-2). However, the present AGOS splits the initial offensive objectives of tactical air between two control agencies, the TACC and the CTOC through the DASC. The JTF Commander is responsible for setting initial objectives that are mutually supported by the Army and Air Force Component Commanders. Yet, in the execution of current operations, the ability of the present AGOS to sieze and maintain the initiative through a single manager is limited. With respect to the selection of weaponry, the present system does place total control with the TACC. However, with the CTOC determining a current objective to be supported at a time and place by tactical air, the aircraft weapons loads that the TACC has available to commit may not be compatible

with the target selected. The problem of weapon/target incompatibility resulting from the present AGOS was as high as twenty percent for planned targets in Southeast Asia (26:68).

In summary, the present AGOS splits the control of tactical air assets through the apportionment process between the TACC and the CTOC/DASC. The split complicates maintenance of the initiative with respect to offensive tactical air operations. In a similar manner, defensive tactical air operations are degraded. For tactical air to be effective against attacking enemy forces,a "well-developed and coordinated" air operation is necessary (2:2-2). And,although centrally managed by the TACC, tactical air is controlled during the execution by two different agencies. The inability of the present system to centrally control the execution of tactical air on either side of the FSCL eases the enemy defensive problem and does not maximize the impact of tactical air upon the enemy offensive tactics. Thus, the present AGOS does not take full advantage of the principle of siezing the initiative.

The JALBS concept, in contrast to AGOS, provides for a central manager, the JCCC, who is responsible for maintaining the initiative of tactical air operations. The JCCC would exert absolute control of time, place, and weaponry. More important than the control aspect is the joint objective coordination that would take place at the JCCC through the Joint Army and Air Force battle staffs. Through the joint coordination of objectives, the JCCC would allow the JTF Commander to better secure or maintain the initiative, preserve freedom of

action, and impose his will on the enemy. The vehicle that would allow for siezing the initiative is the joint target intelligence that would terminate at the JCCC. Through intelligence, the JCCC could take the proper actions to execute air strikes, to immediately influence the enemy's course of action, or to maintain the initiative of friendly forces. The JCCC would have a better view of the battle than the TACC or CTOC operating on independent target intelligence. Also, the ability of the JCCC to direct artillery fires on targets to mutually support tactical air strikes is a positive factor for the JALBS concept. Although the AGOS provides for supporting artillery fire also, the JCCC would be more directive than the present AGOS procedures for either supporting fires or suppression of enemy air defense fires.

The JALBS concept, by eliminating the gray area, reduces the air support to one major mission instead of two, CAS and interdiction. The JALBS concept, in effect, reduces CAS to the immediate area in front of the FEBA and combines all other types of air strike missions to battlefield interdiction. The concept of battlefield interdiction, starting 4500 meters from the line of contact to the maximum range of friendly aircraft, is unique,but it allows for the effective concentration of tactical air to support the principle of siezing the initiative.

The proposed changes for apportionment procedures in the JALBS concept would maximize the number of aircraft available to the JCCC for use in securing or maintaining the

initiative. Thus, the total additive features of the JALBS concept tend to support the principle of siezing the initiative better than the present AGOS.

Concentration of Effort

Proper application of the principle of concentration of effort or mass may permit numerically inferior forces to gain a tactical advantage.

> This capability allows the commander to achieve desired objectives in a minimum of time. Moreover, concentration is essential to application of the principle of economy of force; no more effort should be devoted to a task than is necessary to achieve the objective (2:2-2).

These two principles are combined into one for discussion in this chapter. In order to achieve these two interrelated principles, optimum combat power must be concentrated at the proper time and place.

The mobility of modern battle requires centralized control to rapidly mass decisive combat power from widely dispersed locations. Complex enemy defenses will require the proper concentration and mix of forces in order for friendly forces to be effective. Targets nominated for air strikes could require massed air and artillery fires as well as support air missions, electronic warfare support, and friendly air defense cover.

The present AGOS does not provide a central manager with authority over all the forms of combat power available to a Joint Task Force. The split in control of combat power resources makes it more difficult to concentrate the optimum mix

of combat power at the proper time and place. The JALBS concept provides the JCCC with the necessary authority to achieve the proper application of the principle of concentration.

Speed of Action

The principle of speed of action has also been called the principle of movement or flexibility. Two of the distinctive capabilities of tactical air are speed and maneuverability. The exploitation of the two distinctive capabilities of tactical air is shared by both AGOS and the JALBS concept. Because of the JCCC receiving target nominations from both the Army and Air Force intelligence systems and the use of a fast FAC to verify nominated targets, the JALBS concept exploits tactical air across a larger area, faster. The fast FAC could also provide a quicker response for indirect fires through verifying targets beyond observation by ground forces. The timely, reliable information provided by the fast FAC on enemy activity would provide a sound basis for JCCC decisions to strike nominated targets. Figure 13 illustrates the fast FAC's mean target acquisition distance as a function of crew configuration, speed, and pass. Figure 14 shows the probability of nonacquisition as a function of crew configuration, speed, and pass. Combined, the two figures support the ability of the fast FAC to provide the validation of targets nominated for strike. Information contained in Figures 13 and 14 was extracted from a Department of Defense study, Low-Altitude, High Speed Visual Acquisition of Tactical and Strategic Ground Targets, May 1967. The above study confirms the ability of a

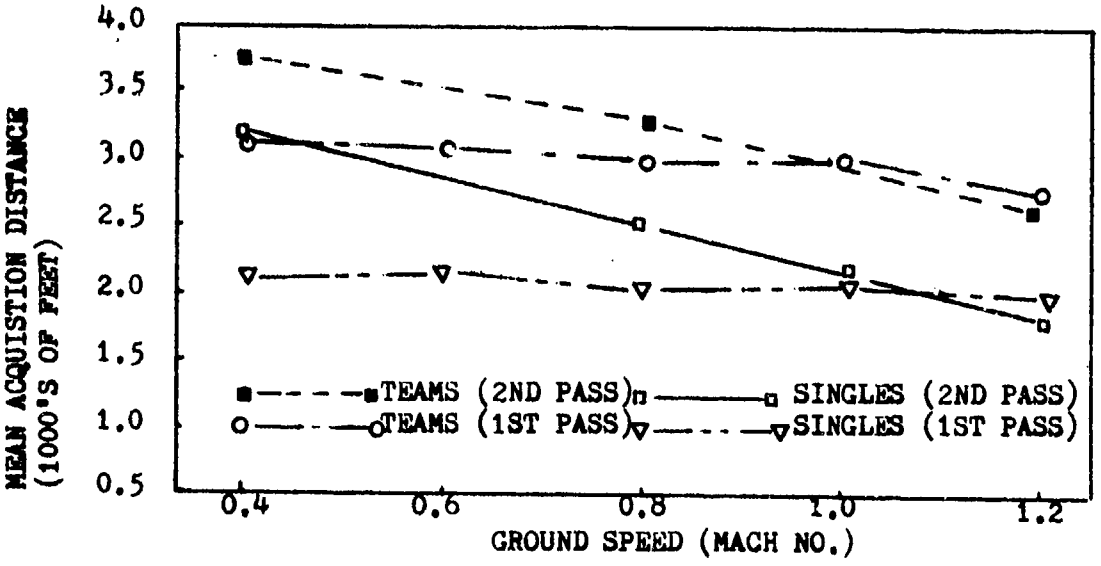

Figure 13. Mean Acquistion Distance As A Function Of Crew Configuration, Speed, And Pass

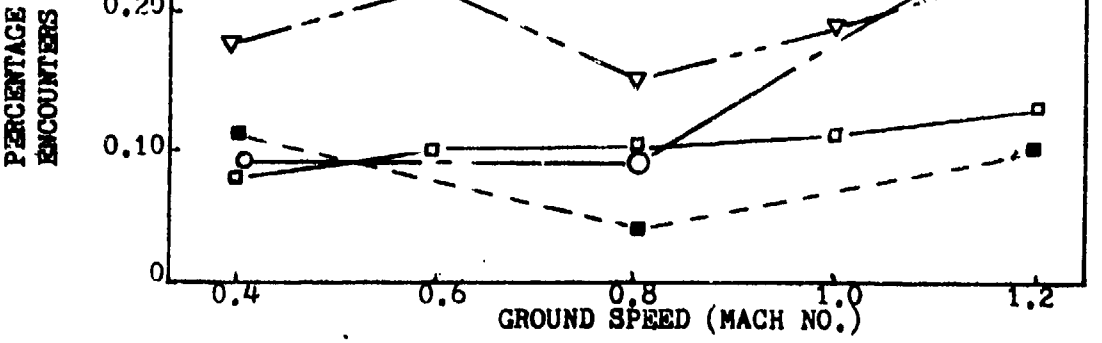

Figure 14. Probability Of Nonacquistion As A Function Of Crew Configuration, Speed, And Pass

fast FAC flying in an F-4 aircraft to find or verify targets for the JCCC Battle Staff. The acquisition probability of a crew to acquire a target, such as deployed vehicles, ranged from 100% at mach number (MN) 0.4 to 90% at MN 0.8. A moving armored column, second echelon forces, could be located 100% of the time at MN 0.8 and 90% of the time at MN 1.2. The acquisition probabilities given above assume one pass over the target area. Even small targets, such as a radar van, showed a high acquisition probability, ranging from 50% to 80%.

The use of the fast FAC in the JALBS concept allows an immediate target finding and verification capability that does not exist at the present time in the AGOS. Although the fast FAC had been used in the past as a part of the interdiction missions flown in Southeast Asia, currently, the USAF does not train for the fast FAC mission. If the fast FAC were reincorporated into the present AGOS, the AGOS model would possess a potential capability to improve the speed of action for target strike response. Having the fast FAC work through only Air Force channels under AGOS and not through a joint battle staff, such as the JCCC, is a limiting factor. The JALBS concept incorporates a joint system for target nomination and the use of a fast FAC for target strike control and verification. Combined, these two portions of the JALBS concept support the principle of speed of action better than the present AGOS system does.

Surprise

> Military and psychological advantages may be gained by striking an enemy at a time and place not of his choosing, and in a manner for which he is unprepared. It is not essential that an enemy be taken unaware but only that he become aware too late to react effectively (2:2-2).

Surprise is gained by employing speed, maneuverability, innovative tactics, or deception on an enemy target that is significant to the battle. Surprise gained on an enemy target or action that will not influence the battle is of little consequence. The ability of the JALBS concept to locate and confirm valid targets that will influence the battle requires the introduction of the JCCC. The present AGOS provides separate target nominations, that could result in Air Force interdiction strikes on targets of no immediate consequence to the ground battle. Thus, although surprise can be achieved with either model, only the JALBS concept provides for a safeguard of validating Air Force strike targets on the basis of impact on the ground maneuver.

Security is often considered part of surprise, as security is a means to prevent surprise on friendly forces. Security provides for continued freedom of action and initiative. "Security is gained by aggressive efforts to obtain and evaluate information about the enemy and continuous readiness to respond to all threats, internal and external" (2:2-2). The expanded interchange of intelligence that exists in the JALBS concept between the CIC and G-2 element, and the CTOC and DASC, maximizes the joint intelligence gathered on the enemy course of action. Combined with the termination of joint

target intelligence at the JCCC, the intelligence crosstell of the JALBS concept should provide for better threat alert determinations than the present AGOS.

Simplicity

Simplicity of operations that involve great numbers of complex and varied firepower may be difficult to achieve under the present AGOS model. For example, what happens when enemy artillery units, located by army intelligence, are located beyond the range of friendly artillery fires? In such a case, the enemy artillery units would normally be beyond the FSCL. The AGOS model allows for two courses of action. The Army may use apportioned sorties, either preplanned or immediate, to strike the target or request the Air Force to strike the target, using Air Force apportioned interdiction sorties. The latter course of action may not be open, depending on the availability of Air Force interdiction assets or higher priority targets located beyond the FSCL. The first course of action may not be feasible because of the various support missions that could enhance the survival of strike aircraft operating in the high threat environment of the modern air/land battle. For example, the strike may require counterair, wild weasel, or electronic warfare mission support that is normally controlled by the TACC and not the DASC, who would control the strike aircraft. The strike may also require a FAC, who would not be able to operate in the high-threat surrounding the given target area. The ability of the present AGOS model to structure a strike package sufficient to destroy the enemy artillery

in a timely manner is suspect. The various control procedures of the present AGOS model are the primary hinderance to affecting simplicity of action in a modern air/land battle. The JCCC is modeled to allow for the flexibility to control the great numbers of complex and varied firepower available to commanders for use in a modern air/land battle.

The case of the enemy artillery units located by Army intelligence beyond the range of organic Army weapons examined above would be handled in the JALBS concept in the following manner. The target nomination would be passed to the battle staff at the JCCC. The target would then be evaluated by the Corps G-3 element and given a priority relevant to other targets of importance to the ground commander's scheme of maneuver. In the AGOS system, this step would have been completed at the CTOC. However, the JCCC battle staff would compare the given target with other targets nominated by Air Force and Army sources, and reference the complete air/land battle picture given by the various orders of battle maintained at the JCCC. Upon completion of the given targets evaluation and if assigned the necessary priority, the JCCC would direct a firepower package to destroy the target. The JCCC's vision of the complete air/land battle and central directive authority over all air and ground firepower assets results in the JALBS concept having a less complex system than the AGOS system.

Cooperation of all Arms

> Spurring the drive toward joint concepts and procedures is recognition that, in a tactical environment, there cannot be distinct air and land battles. Neither service can go it alone (48:23).

Cooperation of all arms, that is the ability of Army and Air Force commanders to mutually support each other in a modern air/land battle, is the purpose behind both systems, AGOS and JALBS. The degree that mutual support can be gained in either model must be measured in terms of qualitative support and not quantitative support alone. The AGOS model, with its supporting apportionment of air assets process, may be able to provide the quantitative air support required in a modern air/land battle. However, if the allocation is disproportionate to the threat, there can be a quantitative shortfall of air power in the AGOS model. This shortfall can be adjusted, but the time required for adjustment may have a serious impact on ground units dependent on air support. The apportionment procedures of the AGOS model also limit the maximum number of scheduled air strikes by placing certain CAS sorties on alert. These immediate CAS sorties are necessary but should be reduced to a minimum, in order to allow for the orderly flow of a maximum number of air sorties. The JALBS concept reduces the number of alert aircraft by using preplanned sorties or diverting airborne sorties to satisfy immediate CAS requests.

Under the present AGOS system, there is no interaction between decisionmakers, Army and Air Force, for current operations. The ability of the AGOS model to provide qualitative air support for Army ground forces is thus limited; and the

cooperation of all arms is difficult to achieve. The JALBS concept provides through the joint battle staff an ability to mass the necessary firepower and supporting fires, thus achieving quantitative and qualitative striking power for the cooperation of all arms.

Control

The principle of control has been referred to as unity of effort or unity of command. Air Force Manual 1-1, 15 January 1975, states:

> The characteristics and capabilities of aerospace forces allow them to be employed in diverse and multiple combat aerospace tasks in an area of operations regardless of its geographical dimensions. To realize their full potential and effectiveness, aerospace forces are employed as an entity. The unified application of aerospace power in an area of operations is best achieved through a commander of aerospace forces who has the responsibility and commensurate authority to prosecute the overall aerospace effort. Centralization of this responsibility and authority under a single commander of aerospace forces precludes dissipation and fragmentation of effort, and permits the integrated, responsive and decisive application of available aerospace power to those tasks that best achieve objectives. In short, the unity of effort /control/ afforded by this arrangement results in the most efficient and effective application of aerospace power (2:2-3).

The JALBS concept does not conflict with the stated Air Force policy of unity of effort. The consolidation of tactical air control in the JCCC, under the direct responsibility of the Air Force commanders' representative, is consistent with Air Force Manual 1-1. The blending of Air Force and Army decisionmakers at the JCCC provides for a more effective use of airpower across the area of operation and

incorporates immediate Army advice and firepower support on targets selected for attack.

The AGOS model provides centralized control of air assets through the TACC. But, the apportionment procedures that give a percentage of tactical air to Army control, through the DASC, in fact fragments a part of this centralized control. Fragmentation is due to the large area of responsibility of the DASC in the AGOS model. The JALBS concept retains the DASC as a control agency but limits the area of responsibility.

Table 2 provides an alpha-numerical display of the relative merits of the AGOS and DOFL models as compared to the principles of war. A scale of zero to five is used. A score of five is awarded when the model maximizes the principle of war addressed, and a lesser value is awarded as the model reflects less compliance with the principles of war. Subcomponents of the various principles that were discussed in the preceeding text of Chapter 4 are addressed. A percentage of improved compliance is shown in the far right column of Table 2. The mean improved percentage of compliance is 68.5 percent for the JALBS concept. Since the numerical values assigned to each subelement of a principle was a subjective determination, the actual proof of improvement will be correlated with the war game results to be addressed at the end of this chapter. If the JALBS concept has a 68.5% or greater improvement in targets destroyed, the subjective evaluation will be substantiated.

Table 2

MODEL EVALUATION

Principles of War	Model AGOS Merit Sub	AGOS Number Total	JALBS Merit Sub	JALBS Number Total	Predicted Percent Improvement
Seizing the Initiative					
Time	2	2	4	4	
Place	2	4	4	8	
Weaponry	3	7	5	13	
Freedom of Act	3	10	5	18	
		10		18	80%
Concentration of Effort					
Economy	3	3	4	4	
Execution	2	5	4	8	
		5		8	60%
Speed of Action					
Intelligence	2	2	4	4	
Fast FAC	4	6	5	9	
		6		9	50%
Surprise					
Intelligence	3	3	4	4	
Tgt Validation	2	5	4	8	
Security	3	8	4	12	
		8		12	50%
Simplicity					
Agencies	3	3	3	3	
Firepower	2	5	5	8	
Flexibility	2	7	5	13	
		7		13	85%
Cooperation of All Arms					
Quantity	3	3	5	5	
Quality	2	5	5	10	
		5		10	100%
Control					
Centralized	4	4	4	4	
Joint	2	6	5	9	
Responsive	3	9	5	14	
		9		14	55%

TIME

The JALBS concept is a prescriptive change to the AGOS system. The time momentum element of the JALBS change to AGOS needs to be examined for impact. The addition of the JCCC to the JALBS concept brings an additional time delay to the air request net. Figure 15 illustrates the time momentum of the AGOS model with the JALBS concept added. A set number of ten is given to each electronic transmission that results in a decision or action. In the AGOS model, a time factor of 10 occurs with the passage of an immediate air strike request to the DASC. The time factor would be the same for a target nomination passed to the CTOC through Air Force channels in the JALBS concept. At units below corps, there is no change in the time factors of the two models. The block drawn around the DASC, TACP, TASE, and Corps TOC indicates collocation of these agencies at the corps level. Under the AGOS model, the air strike request may be passed directly from the DASC to the TUOC; but normally the DASC passes the request to the TACC for action. The time factor from DASC to TACC to TUOC or to the CRC is two time factors. At the corps level, the JALBS concept calls for the target nomination to pass to the JCCC and then to the TACC and TUOC or CRC. The addition of two time factors over the AGOS model could be considered a negative element of the JALBS concept. The negative time element could be eliminated by combining the JCCC and TACC or by placing the JCCC in with the CTOC complex. Since the JCCC functions

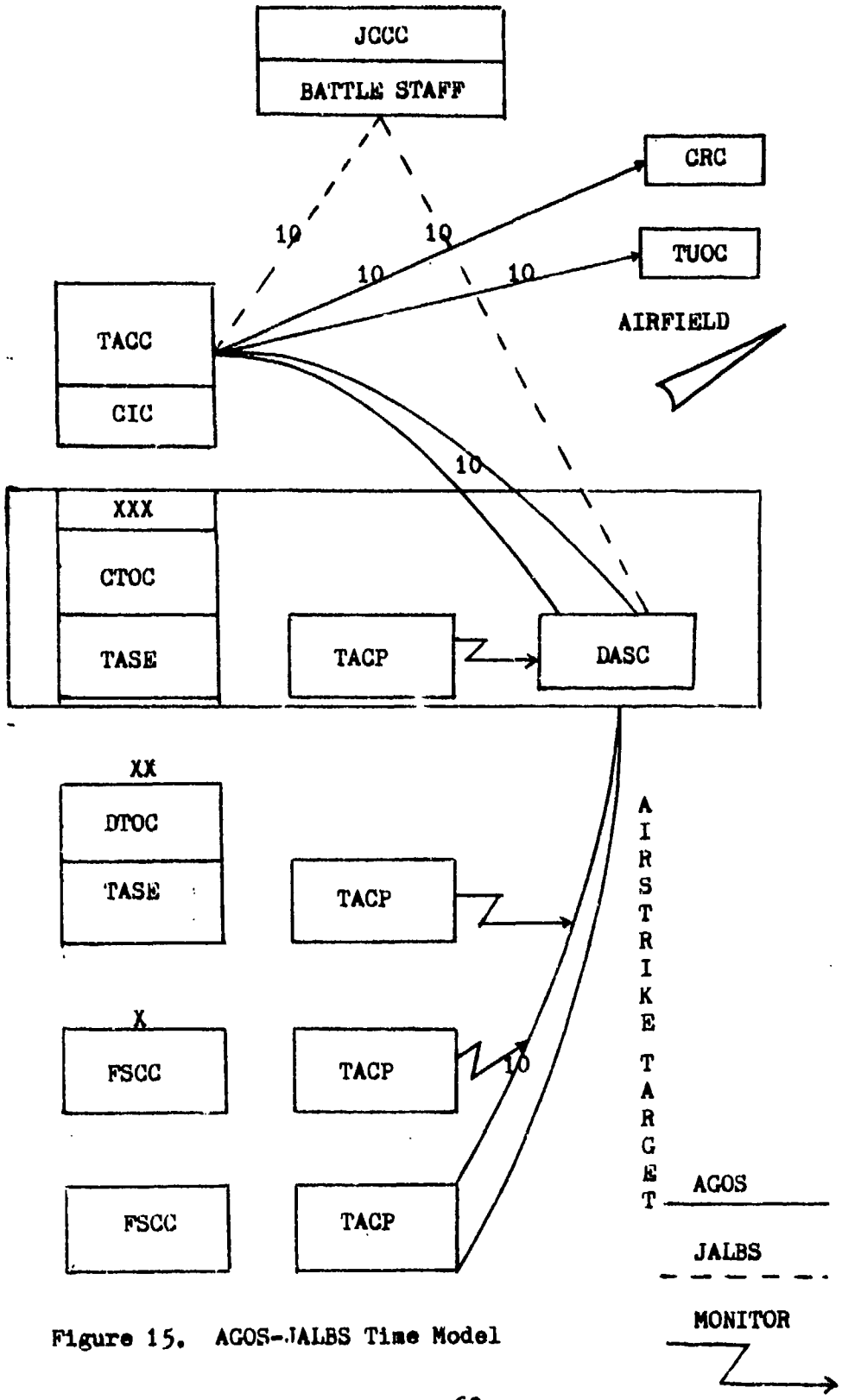

Figure 15. AGOS-JALBS Time Model

as a current air operations battle staff, the best location for the JCCC would be within the TACC.

SPACE MOMENTUM

Space momentum is the ability of either model to maintain, during combat operations, dispersion of air strikes, accuracy of intelligence, maximum sortie rate, maximum number of valid targets struck, and concentration of available firepower. Dispersion of air strikes is better accomplished under the JALBS concept because of the greater area assigned to battlefield interdiction. The greater area,coupled with JCCC control of supporting missions, allows the effective use of airpower across a greater area than the AGOS model. The FSCL in the AGOS model could restrict air strikes inside the FSCL because of coordination procedures with Army ground units.

The accuracy of intelligence can be improved through models, as well as through improvements in equipment for source gathering. The AGOS model does not provide for direct interface between Air Force and Army intelligence, as does the JALBS model. The JALBS concept incorporates a joint battle staff with access to all orders of battle, air, ground,and electronic. The joint nature of the JALBS model and the intelligence interface should provide key decisionmakers with a more accurate intelligence picture than does the present AGOS model.

The ability of either model to maintain a maximum sortie rate is dependent upon proper scheduling of a maximum number of available aircraft. The JALBS concept reduces the

number of aircraft on alert, which makes available a greater number of aircraft. This greater number of aircraft can then be effectively managed in order to produce a maximum number of air sorties. With more aircraft phased into the attack plan, a greater capability to surge and recover is possible. However, since the apportionment procedures of the AGOS model could be adjusted to provide a minimum number of aircraft on alert, neither model can claim a clear advantage for maintaining a maximum sortie rate based solely on available aircraft. The JALBS concept incorporates the scheduling technique of time blocks, instead of set times for strike, as does the AGOS model. This procedure insures the JALBS concept of a manageable sortie rate as well as a better recovery time following a surge of air strikes. The additive effect of having a minimum number of aircraft on alert and block time scheduling, allows the JALBS concept to maintain a maximum sortie rate.

The JALBS concept has the potential to destroy a greater number of valid targets than does the AGOS model. This potential is due to the increased intelligence capability of JALBS and the use of the fast FAC for target verification. The ability of the JCCC to direct concentrations of firepower will aid in assuring a greater number of valid targets destroyed, as well as the concentration of firepower. The use of mutually supporting Army and Air Force firepower cannot be easily achieved in the present AGOS model, due to the lack of joint procedures to direct such fires.

WAR GAME RESULTS

In order to quantify the relative merits of AGOS and JALBS, the writer worked with the Air/Land Battle Facility of the US Army Command and General Staff College (USACGSC) in the war gaming of the Middle East Scenario of USACGSC course 3141/7. The scenario dealt with a deployed Joint Task Force (JTF-30) to the notional Middle East country of Dromar. JTF-30 consisted of the 20th Corps and the 10th Air Force. The Air Force Troop List for JTF-30 was developed by the writer. The 20th Corps Troop List was developed by the USACGSC. The mission of JTF-30 was to deploy to the Republic of Dromar and in conjunction with the Dromarian Defense Forces to halt the enemy advance at line hold (see Figure 16) and to conduct offensive operations to restore the Dromarian Border and territorial control.

Methodology

The methodology used in the war game came from the Combined Arms Center Development Agency (CACDA). The purpose of the war game was to determine the outcome of a battle in terms of battlefield movement, attrition of opposing forces, and force consumption rates. The game was based on the situation shown in Figure 16.

The game addressed a resolution at battalion level of the US forces and the regimental level for enemy forces. The enemy force was a Soviet equipped and doctrine oriented combined arms Army and Air Force. The game did not consider

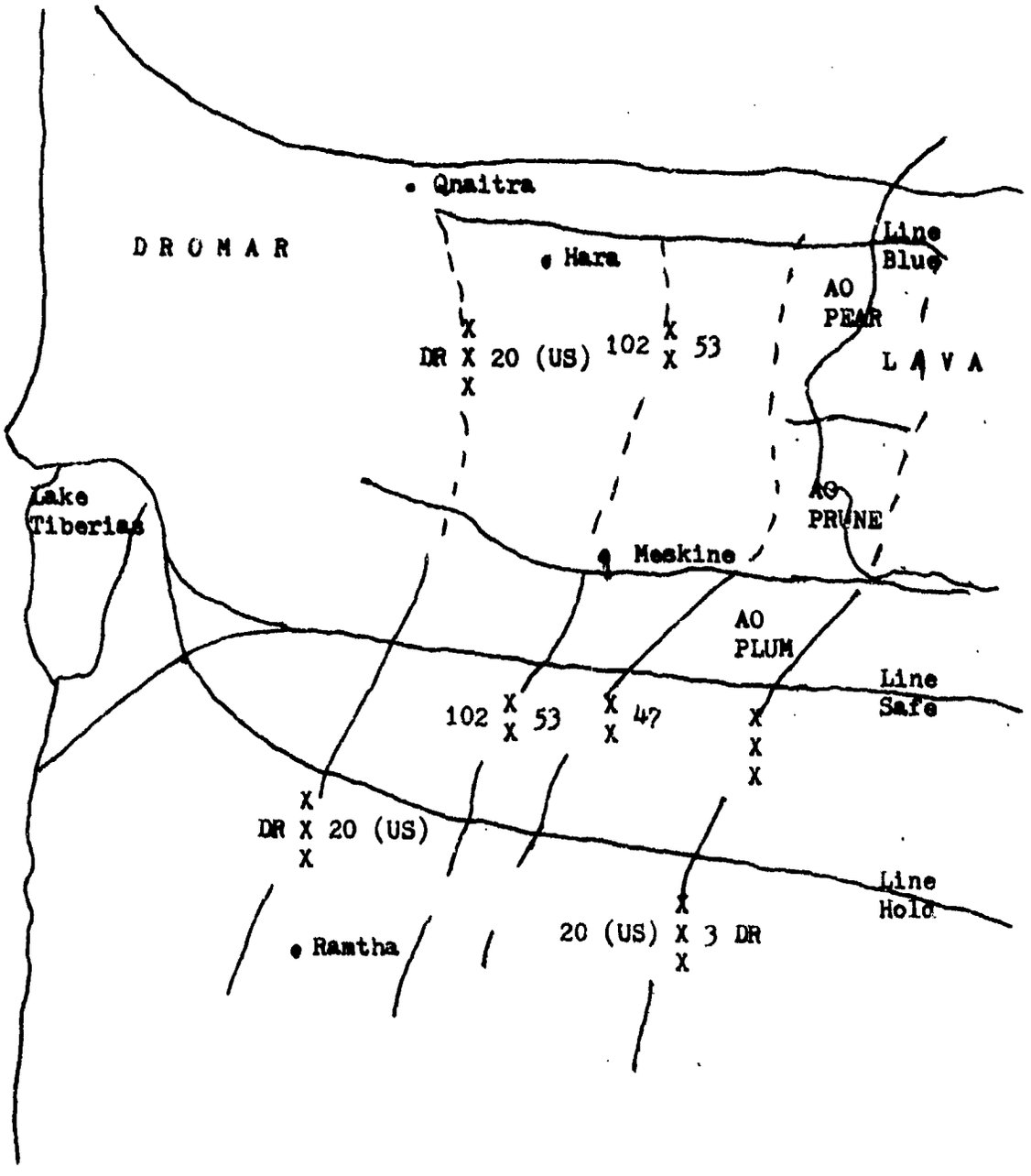

Figure 16. War Game Order Of Battle

logistical, administrative, or rear area actions. The game was an open map maneuver conducted in a series of critical incidents (CI). A CI is a major action, covering four hours, in which selected parameters of the game can be measured.

The war gaming was done with four functional sub-elements, a controller, a methodology team, a Blue Team, and a Red Team. The controller directed the actions and interactions of the Red and Blue Teams and resolved methodology conflicts. The methodology team developed a set of procedures, rules, and formulas for the gaming process. The Blue Team conducted a deliberate attack, using the derived methodology; and the Red Team defended, using derived methodology.

In order to evaluate the effects of the AGOS and JALBS systems on the conduct of ground battle, the war game was conducted twice through one CI each time. Only Air Force air to ground strike results from each of the two CI will be addressed in this thesis.

AGOS

The first model evaluated was AGOS. Prior to starting the CI, an apportionment process for available Blue air was established by the game controller. The first input to the apportionment process was an assessment of the Red Air Force. The Red Air Force consisted of 25,000 men and 450 combat aircraft. The 450 aircraft were divided as shown below:

Number	Type	Remarks
10	IL-28	Light Bombers
50	MIG-17	Ground Attack Fighters
45	SU-7	Ground Attack Fighters
45	MIG-23	Ground Attack Fighters
300	MIG-21	Fighter Intercepters

The Red Air Force was assumed to have been attrited by 30% at the time of CI-1. This attrition left the Red Air Force with 7 IL-28's, 35 MIG-17's, 31 SU-7's, 31 MIG-23's and 210 MIG-21's. Thus, the Red Air Force had 314 combat aircraft, 104 which could conduct air to ground attacks against the Blue ground force and 210 fighter intercepters to conduct counter-air operations against the Blue Air Force. Since the Dromarian Forces were conducting an attack at the same time as the 20th Corps, the game controller directed 50% of the available Red Air Force against the Dromarian ground and air forces. This left a Red Air Force threat of 52 ground attack fighters and 105 fighter intercepters. To counter this threat and to support the 20th Corps ground attack, the following apportionment of airpower was made:

No. of Aircraft	Type	Mission CAS	INT	CA	Support
96	F-4E	60%	40%	-	-
24	F-15A	-	-	100%	-
18	F-105G	-	-	-	100%
9	RF-4C	-	-	-	100%
5	E-3A	-	-	100%	-
1	DC-130	-	-	-	100%

This apportionment resulted in 58 F-4E aircraft being allocated to the Blue ground forces for CAS. A sortie rate of 1.2 was used, and this resulted in 70 CAS sorties during the first day of battle. As the war game dealt with a 16 hour day, the CAS sorties available during CI-1 were 18 sorties. Similarly, the interdiction sorties for CI-1 are given as (96)(.40)(1.2)/4 = 12 sorties. The aircraft weapons load for CAS and interdiction sorties was 50% Air to Ground Milliles (AGM-65), 25% Cluster Bombs (CBU), and 25% Laser Guided Bombs (LGB). In order to arrive at the number of sorties on target (SOT), the following formula was used:

SOT = S - (.08S + .1S) where S = sorties and

.08S = sorties lost to attrition and

.1S = sorties noneffective/suppressed

The eight percent loss rate was used to reflect the enemy ADA capability and the lack of joint procedures for affecting suppression of enemy ADA. The ten percent noneffective or suppressed rate was used to reflect a lack of joint target intelligence and target verification prior to air strikes. Applying the formula to the 30 sorties in CI-1, the results are SOT = 30 - [(.08)(30) - (61)(30)] = 30 - (2.4 + 3) = 30 - (2 + 3) = 25. Losses were assumed to be equal across the various aircraft weapon loads. Therefore (.5)(25), or 12 AGM-65, sorties were on target and (.25)(25), or 6 CBU, sorties and (.25)(25) or 7, (rounded up to equal 25 sorties) LGB, sorties were on target.

The kill rate for AGM-65 sorties on target was assumed to be 2 tank kills per sortie. Two kills per sortie was

selected to reflect one pass over a target area and only one target area per sortie. The fact that some pilots would be unable to launch more than one AGM-65 per pass was offset by the fact that some target areas would allow two passes or a second target area could be attacked. The kill rate for CBU sorties was two artillery crews per sortie. One artillery crew was assumed to have five people. The one pass, one target area assumption was used for CBU sorties. LGB sorties were allotted one kill per sortie. The F-4E was assumed to carry six AGM-65's or six CBU's or two MK-84 (2,000# bomb) LGB's. The AGM-65 was restricted to tank targets; the CBU sorties were restricted to artillery targets; and the LGB sorties could strike either.

Findings

The split of ground attack air assets of 60% to CAS and 40% to interdiction resulted in a limited increase in the combat power ratio between the Red and Blue ground forces in the zone of the main attack. Although all the CAS sorties were allotted to the two zones making the main attack, the limited sorties accounted for only 22 tank kills and 6 artillery crew kills over the first CI of four hours. One AGM-65 aircraft was lost, and one CBU aircraft was suppressed. Interdiction sorties lost one AGM-65 aircraft and had two LGB sorties suppressed. Total kills for the interdiction sorties were 11 tank kills and 6 artillery crew kills. No interdiction sorties were flown inside the FSCL. Because of the limited air strikes

in the zone of the main attack, the attack failed to achieve a significant penetration or reach the desired division objective.

JALBS

The gaming process stopped at the end of the first CI; and airpower was readjusted, using the JALBS concept. The air apportionment remained the same, except that only 10 percent of the F-4E aircraft were apportioned to CAS. The JCCC directed the rest of the air strikes on enemy units directly influencing the main attack. The DOFL model generated a greater number of aircraft by scheduling them in the following manner: twelve aircraft were launched each hour and reloaded and relaunched eight hours later. This procedure resulted in a smooth and manageable flow of aircraft. The end result was a 2.0 sortie rate for the first 16 hours of battle. Aircraft were held for launch until the JCCC directed them against at least two targets. All targets struck during CI-2 were attacked by air and artillery simultaneously for mutual support and concentration of firepower.

The formula used for sorties on target was adjusted to reflect the artillery suppression and massed airpower. Instead of an 8 percent loss rate, a 5 percent loss rate was used. Instead of a 10 percent, non-effective rate, 2 percent was used. To game the JCCC, the Blue ground commander and Blue Air Force commander directed firepower by observing the gaming map at the same time, with the ground commander selecting those enemy units to be attacked. Fast FAC sorties were

allocated from F-4E and RF-4C assets. The impact of the fast FAC was a reduction of the non-effective sortie rate.

Sorties on target for CI-2 were 46. The kills per sortie for each aircraft weapon load was adjusted to reflect more target areas per sortie. The AGM-65 rate was 3.5 per sortie. The CBU rate 4 per sortie; and the LGB rate 1.5 per sortie. Fifty percent of the sorties had AGM-65's, 25 percent CBU's and 25 percent LGB's, the same as for CI-1.

Findings

The ability to mass all airpower in front of the main attack allowed the attack to achieve an overwhelming superiority of relative combat power. Total kills were 99 tanks and 44 artillery crews for tactical air. These kills reflect a 200 percent improvement in artillery crew kills.

The results of CI-2 were carried into CI-3, using the JALBS concept to shift airpower against reinforcing enemy tank units that were caught in the open and destroyed.

The results discussed in this thesis are but a small portion of the war gaming results that took place over a two month time frame. The classified results are available for review through the Department of Tactics, US Army Command and General Staff College, Fort Leavenworth, Kansas. In the end, the improvement of the JALBS concept over the AGOS system was greater than the 68 percent that the subjective evaluation predicted.

Chapter 5

SUMMARY

The key to effective use of armed forces lies in the manner in which the force is applied and not in total to the hardware available to an armed force. The Soviets view doctrine in light of recent conflicts and adjust their doctrine to meet changes in hardware effectiveness. Marshal Malinovsky, Soviet Minister of Defense, stated, "We cannot mechanically transfer the experience of past wars to a new situation." The effect of not updating doctrine was illustrated in Chapter 1 by the Israeli Air Force's losses to the Egyptian air defense belt. The USAF-USA Air Ground Operations System is the doctrinal system that this study examined. The thesis hypothesis is: Can the present Air Ground Operations System be improved to provide for a better use of tactical airpower in a modern air/land battle.

Chapter 2 reviewed the mechanics of the present air ground operations system, and Chapter 3 introduced a prescriptive model to replace the existing system. The new model is called the Joint Air Land Battle System. Chapter 4 evaluated the two models in three separate manners. First, the models were evaluated, subjectively, for the ability of each model to support the principles of war. The second evaluation examined each model as related to the measure of time and space momentum.

The third evaluation was a classified war gaming of the two models. Only the unclassified results were discussed.

CONCLUSIONS

The general conclusion of this thesis is that the present Air Ground Operations System can be improved to provide for better use of tactical airpower. This general conclusion is constrained by the scenario of the thesis; that is, a contingency force composed of a US Army Light Corps and a supporting tactical Air Force. Findings and conclusions of the thesis should not be considered valid for the NATO setting of Europe where there exists a separate Air Ground Operations System not addressed in this thesis.

Table 2 of Chapter 4 shows an across the board predicted improvement for the JALBS concept over the present AGOS system. There are five basic reasons for this improvement. The five reasons supported by the evaluation of time/space momentum and the war game results become the five conclusions of the thesis.

First, the JALBS concept maximizes available air assets, through the prescriptive changes in the present AGOS apportionment process. Second, the JALBS concept maximizes the number of valid targets struck, through the intelligence crosstell and joint target nomination procedures. Third, the JALBS concept allows for effective massing of firepower, through the joint battle staff. Fourth, the JALBS concept reduces the complexity of the AGOS model through the elimination of the

gray area surrounding the FSCL. Fifth, the JALBS concept provides the commander with a clearer view of current operations through the JCCC.

RECOMMENDATIONS

The JALBS concept should be field tested in a joint exercise to further validate the conclusions listed above. The impact of new weapon systems such as the F-15, AWACS, A-10, and PAVE TAC should be examined ir exercises and war games to gain an appreciation for the effect these systems will have on both models.

A follow-on study dealing with the manning and internal procedures for a Joint Combat Coordination Center is necessary. The need for both a DASC and a TACC in the JALBS concept should be examined in light of eliminating the DASC. The term battlefield interdiction should be mutually defined by the Army and the Air Force. A backup system for the JCCC should be examined. Such a backup mission could be given to AWACS, CTOC, or the TACC. Fast FAC aircrew training and mission responsibility should be assigned to selected tactical air wings.

Finally, the writer would like to point out that no doctrine should be considered perfect. Our professional duty is to examine the systems and methods that we may be called on to use to protect the national interests of the United States of America.

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VITA

James R. Nichols was born in Los Angeles, California. Following graduation from high school, he received a Congressional appointment to the United States Air Force Academy. In 1966, he graduated with a Bachelor of Science Degree and was commissioned into the United States Air Force. After completing pilot training, Lieutenant Nichols was assigned to fly the F-100 fighter aircraft. Lieutenant Nichols flew a combat tour in the F-100 in Southeast Asia, accumulating 258 combat missions. In 1969 Captain Nichols served in the Air Training Command as an instructor pilot in the T-38 aircraft and as operations officer to the 3501st Student Squadron. In 1971 Captain Nichols attended the United States Air Force Squadron Officers School, Maxwell AFB, Alabama. From there, in 1972, he was assigned to the 8 Tactical Fighter Wing (TFW) Ubon Royal Air Base, Thailand. While stationed with the 8 TFW Captain Nichols flew 125 combat missions over North Vietnam and 52 combat missions in other areas of Southeast Asia. As the Weapons and Tactics Officer of the 8 TFW, Captain Nichols gained experience flying F-4 aircraft laser designator, electro-optical, and fast FAC missions throughout the combat zone. In 1973, Major Nichols was assigned to the Tactical Air Warfare Center, Eglin AFB, Florida, where he flew F-4 conventional munition test missions and later served as Branch Chief for Air-to-Air

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